# Transportation

During the last 15 years, Mashpee has lived through a tremendous real estate development boom. The major increase in traffic volumes and delays on area roads during that period has left us concerned about our quality of life and the community's character both now and in the future.

Those concerns were already evident in 1985-86 when the Town created a "Committee on Mashpee's Goals and Priorities", consisting of 54 representatives of all major Town agencies, homeowners' associations, interest groups and developers, which developed a sketch master plan for the Town and adopted goals and policies for the Town regarding transportation issues. Those goals and policies served as a starting point, along with the goals and policies contained in the Cape Cod Commission's 1991 Regional Policy Plan, in the development of the statements of Goals, Objectives and Policies recommended by this Plan.

Continued public interest in transportation issues was reflected in the results of a public opinion survey undertaken by the Town in May and June of 1992 and completed by 633 residents, in an "Issues Forum" held on August 12, 1992 to kick off the Town's development of this Comprehensive Plan and in the public meeting deliberations and February 1, 1995 public hearing held before formal adoption on December 18, 1996 of the Town's Goals & Objectives by the Planning Board, which serves as the Town's Local Planning Committee. Transportation issues were also a major topic of discussion at the June, 1995 "Vision Workshop" sponsored by the Planning Board with assistance from the Cape Cod Commission.

Work on this Transportation "element" of Mashpee's Comprehensive Plan was begun in 1994 with an extensive traffic counting program and roadway facility inventory conducted by the Mashpee Planning Department, the Cape Cod Commission and Vanasse Hangen Brustlin, Inc., a transportation consultant firm employed by the Town with funding from the Commission. Over the next two years, the Planning Department and consultant prepared projections of future land use changes and traffic growth, identified potential future transportation system problems and developed recommended solutions. Assistance was provided by the Public Works Director, Economic Development Coordinator, Council on Aging President, Regional Transit Authority Executive Director and a Bicycle Planning Advisory Committee made up of local bicyclists and other residents.

The resulting Plan has been prepared in conformance with the guidelines published by the Cape Cod Commission for Local Comprehensive Plans. It is intended to address both near term (5-10 year) and long-term development of the town's transportation infrastructure and services. The critical issues which it considers include:

- projection of future transportation needs and opportunities,
- identification of land use and other regulatory and non-regulatory changes which might reduce infrastructure needs and minimize any adverse impacts from infrastructure development,
- identification of appropriate highway and non-auto facilities and services which will be required or appropriate during the next 5-10 years and at "buildout" of the town,
- identification and preservation of necessary right-of-way for future transportation facilities and
- establishment of funding mechanisms for required facilities and services.

## *Community Goals and Objectives*

The setting of Goals and Objectives was the starting point in the development of our Comprehensive Plan. They provide direction and focus to all that follows. As used in this plan, "goals" are defined as the ultimate

ends we propose to achieve. These are fairly general statements of the ideal outcomes of our efforts. "Objectives" are more specific targets along the way to achieving our goals. They may be one-time events or be ongoing standards against which we can measure our progress. We hope to achieve these goals and objectives through the series of policies and actions specified later in this document.

The original draft of the Goals and Objectives listed below were formally adopted by the Local Planning Committee (Planning Board) in December, 1996. Based on comments by the DPW Director, they were modified and approved on February 4, 1998. In addition, this plan recommends the adoption by reference of the County's 1996 Regional Policy Plan Goals and Policies for the purposes of local review and approval of projects which are Developments of Regional Impact under the terms of the Cape Cod Commission Act and applicable County ordinances.

The adopted goals and objectives are as follows:

**GOAL #1.** TO PROMOTE THE SAFE AND EFFICIENT MOVEMENT OF PEOPLE AND GOODS TO, IN AND THROUGH MASHPEE.

**GOAL #2.** TO ENSURE ADEQUATE MOBILITY FOR ALL RESIDENTS, PARTICULARLY VIA ALTERNATIVES TO AUTOMOBILE TRAVEL SUCH AS BICYCLE AND PEDESTRIAN FACILITIES AND PUBLIC TRANSIT.

**GOAL #3.** TO MINIMIZE NEGATIVE TRANSPORTATION SYSTEM IMPACTS ON THE TOWN'S HISTORIC, SCENIC AND NATURAL RESOURCES AND OVERALL QUALITY OF LIFE.

**GOAL #4.** TO MINIMIZE BOTH THE NEED FOR NEW ROAD CONSTRUCTION AND THE FISCAL IMPACT ON THE TOWN OF ANY TRANSPORTATION FACILITIES REQUIRED TO SUPPORT NEW DEVELOPMENT OR REDEVELOPMENT.

**GOAL #5.** TO DEVELOP APPROPRIATE TRANSPORTATION FACILITIES AND SERVICES TO SUPPORT THE TOWN'S ECONOMY AND ECONOMIC DEVELOPMENT PROGRAM.

**GOAL #6.** TO PROVIDE FOR PROPER MAINTAINANCE OF THE TOWN'S ROADWAY AND BRIDGE INFRASTRUCTURE.

**GOAL #7.** TO MINIMIZE PER-CAPITA ENERGY USE RELATED TO TRANSPORTATION.

## Objectives

**A.** To ensure that new development and redevelopment does not significantly degrade travel times, volume to capacity ratio, reserve capacity or other performance indicators for surrounding roadways or intersections on an annual average peak hour basis.

**B.** To ensure that there is no degradation in traffic safety as a result of new development or redevelopment.

**C.** To ensure that new development and redevelopment pays an equitable share of the cost of mitigating any resulting traffic impacts by both structural and non-structural improvements.

**D.** To ensure that new development and redevelopment minimizes motor vehicle traffic generation and participate in the provision of appropriate alternative transportation modes.

**E.** To ensure that new transportation facilities or improvements are consistent with the Regional Policy Plan and the Town's transportation plan, and have no significant negative impacts on historic, scenic or natural resources.

**F.** To ensure that roadway construction and major reconstruction projects incorporate appropriate safe provisions for bicycle and pedestrian traffic where feasible.

**G.** To increase bicycling and walking as alternatives to automobile trips and as recreational / visitor amenities through development of new facilities, linkage of existing facilities, improvement of road crossing safety, public education and other appropriate means.

**H.** To ensure that public transportation facilities and services are available to provide mobility for those without ready access to other transportation and to reduce motor vehicle use.

**I.** To ensure that energy use impacts are considered and minimized in the planning and development of transportation facilities and services.

**J.** To ensure that transportation facilities and services in Mashpee are coordinated with those of neighboring towns.

**K.** To ensure that stormwater is properly redirected from roadways in order to maintain safe travel conditions but that every feasible effort is made to ensure that such runoff does not adversely affect groundwater or surface water quality or pond, stream, estuarine or wetland ecology.

**L.** To minimize noise, light, dust, localized air pollution, safety and other negative impacts of transportation facility construction and operations on neighboring land uses.

**M.** To ensure that all transportation facilities and services provide proper access for disabled persons.

**N.** To maintain our roadways at a Pavement Condition Index of at least 85 through regular maintenance and repaving, in order to minimize the need for majorreconstruction projects.

# *Inventory*

## Roadway Facilities

Mashpee's transportation system, for the purposes of this plan, includes four primary modes / facility types: **1. private motor vehicles / roadways, 2. bicyclists / bike facilities, 3. pedestrians / sidewalks & trails and 4. public transit services** (broadly interpreted to include taxis, Council on Aging van, school buses and other specialized transportation services as well as the services provided by the Cape Cod Regional Transit Authority). Chapter 4 of the full text of this plan element contains an extensive inventory of the Town's roadway facilities, a discussion of roadway classification with a recommended classification system for Mashpee's roads, current (1994) traffic volumes and levels of service on Mashpee's roadways, a discussion of the traffic handling capacity of our existing roadways and intersections as well as safety, capacity and mobility deficiencies identified by the Town's traffic consultant, an inventory and analysis of existing bicycle and pedestrian facilities and a discussion of available transit and other "alternative" transportation services.

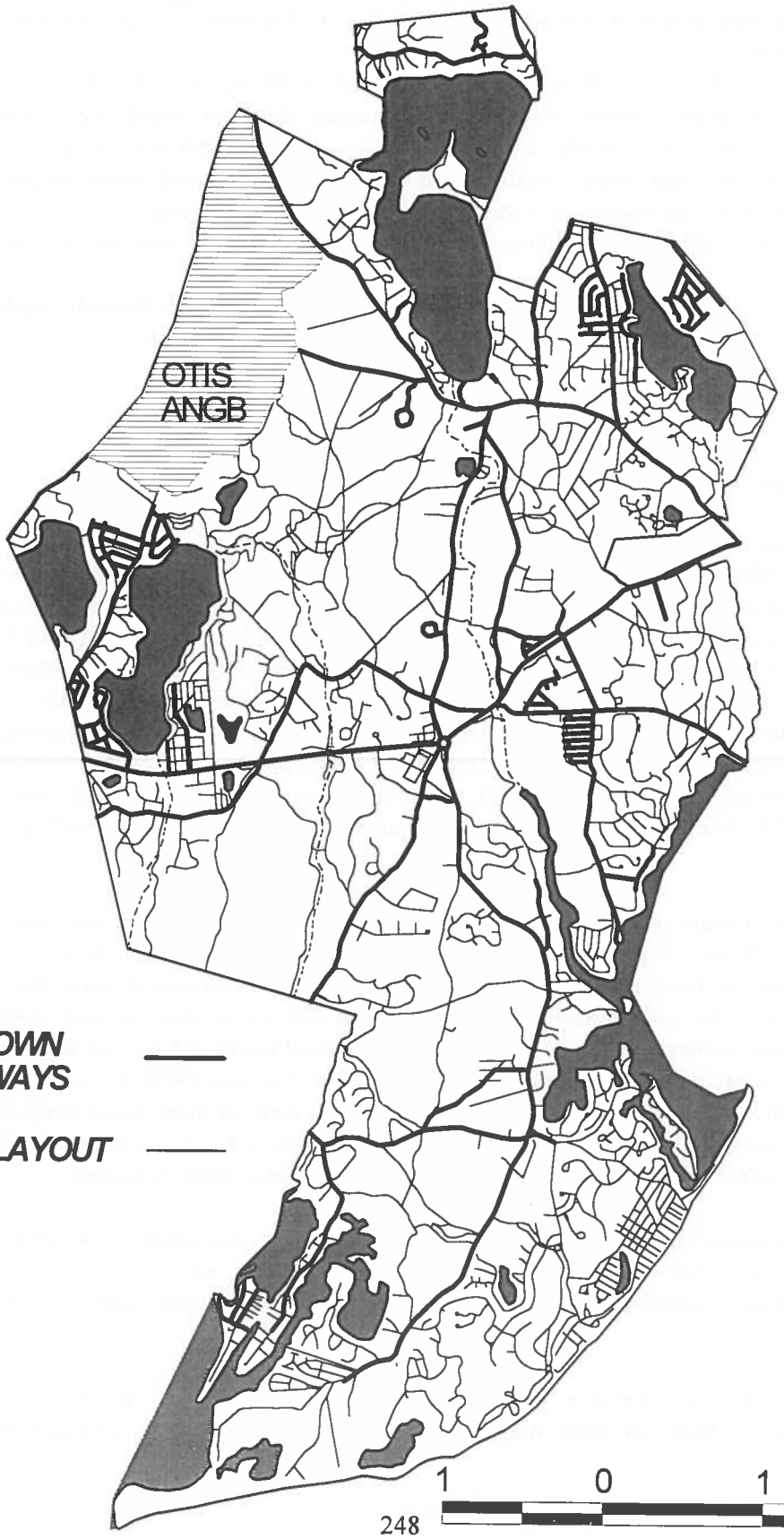
The Town's roadway system includes one state highway, Route 28 (6.09 miles), also known as Falmouth Road. The Mashpee Rotary is part of the state highway. Despite the fact that Routes 151 and 130 are numbered routes, they are Town roads (although the portion of Route 130 east of Great Neck Road, as well as Great Neck Road North and Quinaquisset Avenue were previously laid out and maintained as state highways). Town road ownership is uncertain, with 50.45 miles of roads with known legal layouts (see Map 4-1), 3.03 miles which are paved public ways maintained by the Mashpee DPW but for which there may be no legal layouts, and various other roads which may be public ways or even Town roads based on 1) fee ownership of the underlying land, 2) the fact that they appear to have been originally built by the Town or its predecessor the District of Marshpee, or 3) common law, but whose status is unclear.

Private roadway facilities fall into four general categories. Laid out subdivision streets are the most numerous and serve individual house lots in much of the town. They are not maintained by the Town except for the provision of snow plowing and, only occasionally, emergency repairs authorized by the Board of Selectmen.

The second category of private roadways are the extensive system of unpaved "wood roads", often referred to as "ancient ways". Many of these may have public rights through the common law doctrine of

# Public Road Layouts

# Map 4-1



"prescriptive rights" (based on open and notorious use by the public for at least 20 years, with no attempt by the underlying landowner to block the way or otherwise prevent or prohibit public use). Some may actually be owned by the Town through its ownership of the underlying land, but have been not laid out as Town roads following the statutorily-required procedures for doing so. There are Town meeting records of Town construction and maintenance of some roads for which no statutory layouts are known and whose status is now very unclear (a number of these roads have now become overgrown, closed or destroyed by subsequent real estate development). Some may legally be Town roads and the Town's maintenance responsibility if they were built and dedicated to public use prior to 1846, when the state statute on layout and acceptance of municipal ways was adopted (to limit municipal liability for ways which thereafter came into public use without a specific act of the municipality accepting such liability). Most are legally described as "private ways in public use". The number and length of these roadways, many of which led to bodies of water or other areas formerly used by the general public, has steadily declined over the last 40 years as new residential developments have obliterated them or blocked access to the general public.

A third category of roadway facilities are those within condominium projects which have not been laid out separately as subdivision streets. They operate as streets but have no layout and are, in effect, driveways on private lots owned in common by the condominium association. They are maintained by the association and are generally not plowed by the Town.

The final category are private driveways not owned by a condominium association. These range from those for individual single family homes, to shared driveways, with or without formal easements (some of which have been given street names, like "Poplar Drive", leading to confusion about their status and Town plowing responsibilities), to driveways within commercial and industrial developments to the named "streets" of the Mashpee Commons development, our "downtown", which are heavily used by the public as streets but are actually private driveways on one large private parcel of land.

## Roadway Classification

Highway systems have been broken down into various types and classifications based on a number of factors, including governmental jurisdiction, traffic volumes, funding sources (particularly federal aid sources) and function, but it is the last which is most appropriately used in developing a transportation plan and in specifying roadway standards. Classification can provide a logical basis for establishing geometric design standards for roadway construction or reconstruction, right-of-way widths, speed limits, access controls and similar standards.

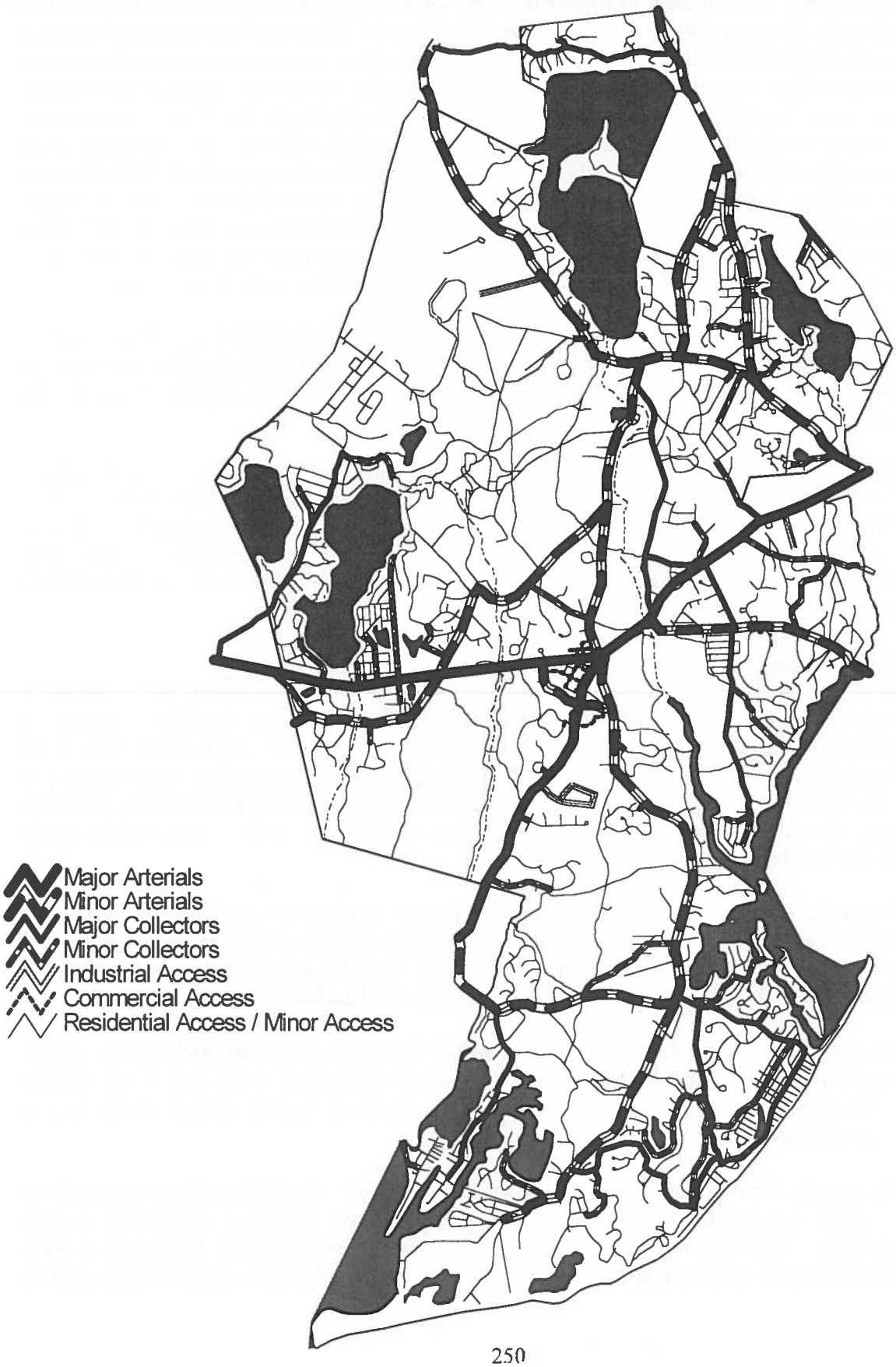
Function, or functional classification, refers simply to the primary purpose for which a road is built and maintained and for which trips on that road are made. Descriptions and names of functional classifications have varied in detail from one jurisdiction to the next, but the basic functions are the same and can be expressed through three basic classes: "arterial", "collector" and "local access".

**Arterial streets** and highways provide for high-speed trips between cities, towns and other activity centers. In Mashpee, they carry the bulk of through traffic between larger neighboring towns and of our seasonal tourist traffic. Arterials constitute the backbone or basic structure of our highway system. Route 28 is an example of an arterial highway.

In contrast with arterials, **local access streets** (sometimes called "minor" streets) provide not primarily for trips between centers, but for direct access to residential, commercial, industrial, agricultural or other structures or property. Their function is not to move traffic quickly between places, but merely to allow people to get to their houses or other property at either end of a trip. Speed is not a major concern on these

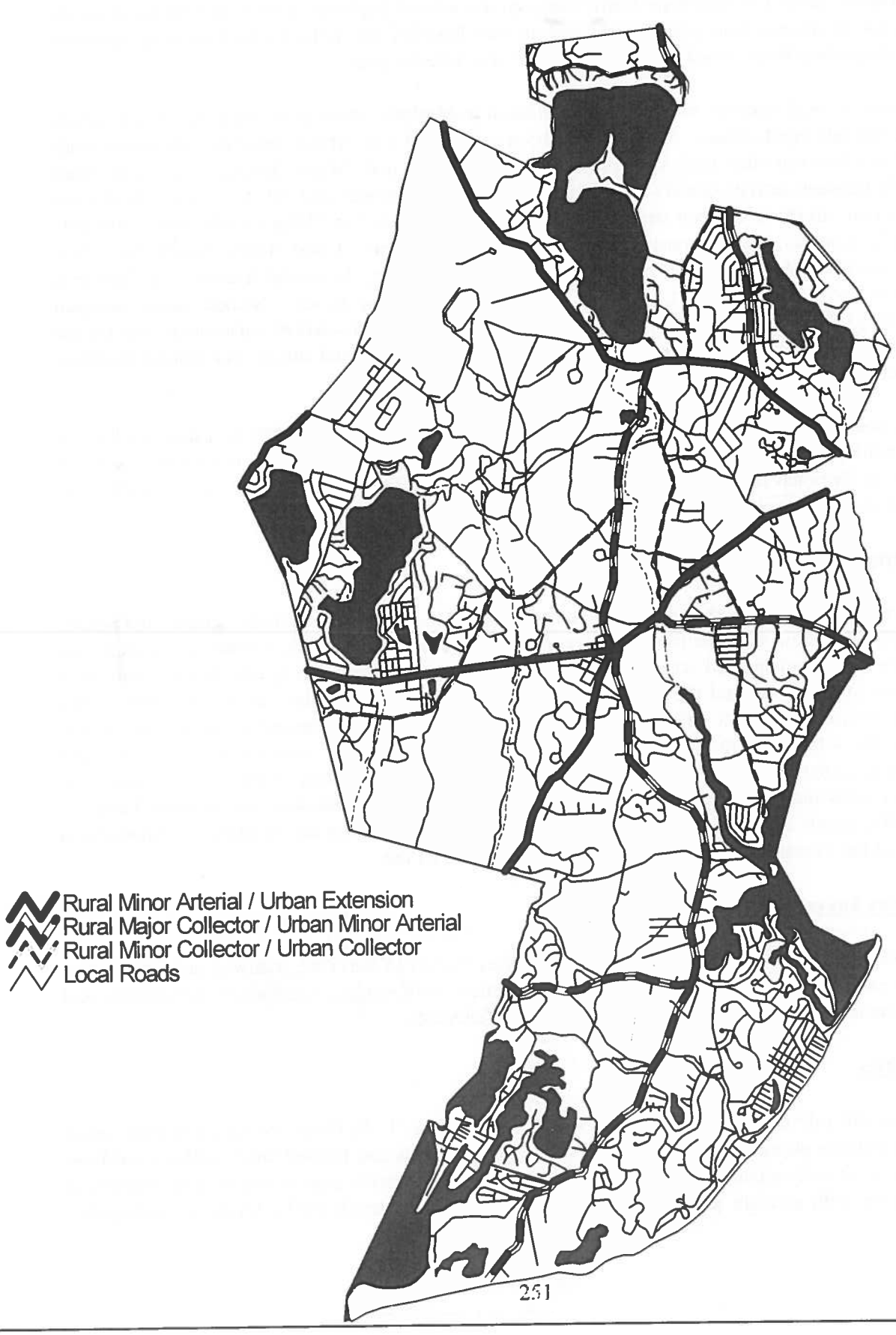
# Functional Classifications

# Map 4-2



# Regional Roadway System Classifications

# Map 4-3



streets and traffic volumes will be low, so roadway standards can be much lower than those for the high-speed high-volume arterials. The vast majority of Mashpee streets fall into this category.

**"Collector streets"** collect or distribute traffic between the arterial highway system and the local access streets. They are an intermediate type of street both in their function and in the level of roadway standards required. Wading Place Road would be a good example of a collector street.

For the purposes of local roadway planning and regulation in Mashpee, these three basic functional classes have been refined into eight classes. Arterials have been subdivided into "Major Arterials", the major roads through Mashpee between other large centers (Routes 28 and 151), and "Minor Arterials", the main roads for local traffic between activity centers in Mashpee and between Mashpee and activity centers in adjacent towns. Collector streets have been designated as "Major Collectors" or "Minor Collectors", primarily based on traffic volumes and relationship to the overall street system. Local Access streets have been broken down into four categories, based on the type of area they service: "Industrial Access" (e.g. Industrial Drive, Bowdoin Road, Echo Road), "Commercial Access" (e.g. "Steeple Street". "Market Street" and part of Shellback Way), "Residential Access" (covering the vast majority of residential subdivision streets) and "Minor Access" a grouping of rural access roads, service roads, residential drives and similar facilities. Map 4-2 depicts functional classification of streets in Mashpee.

In addition to these local functional classifications, there is a Regional Roadway System described in the Cape Cod Commission's Technical Bulletin 96-003. The Regional Roadway System is used for review of Developments of Regional Impact and as the basis for state and federal highway funding decisions. The Regional Roadway System classifications for Mashpee are shown on Map 4-3.

## Traffic Volumes

In preparing traffic volume and other inventory items for this plan, any available traffic studies and reports dealing with previous projects in the study area were reviewed and existing traffic volume information was compiled. This was supplemented with an extensive count program conducted by the Town's consultant VHB, the Town of Mashpee, and the CCC. All counts were taken during the summer of 1994. They included 24- to 48-hour Automatic Traffic Recorder (ATR) counts as well as intersection turning movement counts during the 4:00 to 6:00 PM commuter peak period. All turning movement counts included pedestrians and bicyclists as well as various classifications of motorized vehicles. Daily traffic volumes on main study area roads and at key intersections, along with other relevant information, are shown in Tables 4-1 and 4-2. Traffic counts conducted since 1994 by the Cape Cod Commission are contained in Appendix G of the full text of the Transportation element of the Comprehensive Plan.

## Other Highway Inventory Items

Chapter 4 of the full text of this Plan element also addresses "Level of Service", roadway and intersection capacity, deficiency criteria (safety deficiencies, road segment deficiencies, intersection deficiencies and mobility deficiencies). Figure 3 identifies existing safety deficiencies.

## Bicycle Facilities

Bicycle facilities fall into three general categories or classes. "Class I" facilities are specially built paved bicycle paths which are physically separated from roadway pavements and located either within a roadway right-of-way or on a totally separate right-of-way. Current federal standards require that such facilities be at least ten feet wide, with an eight foot width allowed where very low bicycle traffic levels are anticipated.

**Table 4-1**
**Road Inventory Data**

| Road | From | To | Most Recent Weekday Count | | | | | Seasonal | Summer | Summer | Pvmt | Hourly | Summer |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Date | By(1) | 24 Hr Vol | Pk Hr starting @ | Pk Hr Vol | Factor(2) | ADT(3) | Pk Hr | Width(4) | Capacity(5) | Volume/ Capacity(6) |
| Algonquin Ave | Rte 151 | John's Pond | 8/94 | V | 495 | 4PM | 52 | 1.00 | 495 | 52 | | 2,200 | 0.024 |
| Asher's Path | Rte 28 | Meetinghouse Rd | 8/94 | M | 1,064 | 10:45AM | 95 | 1.00 | 1,064 | 95 | 20 | 2,200 | 0.043 |
| Back Rd | John's Pond | Sandwich Rd | NA(7) | | | | | | | | | 1,950 | |
| Cape Dr | Rte 28 | Sampson's Mill Rd | NA | | | | | | | | | 1,950 | |
| Cotuit Rd | Sandwich Town Line | Rte 130 | 6/94 | C | 3,637 | 4PM | 319 | 1.16 | 4,219 | 370 | 25 | 2,325 | 0.159 |
| County Rd | Rte 151 | Old Barnstable Rd | NA | | | | | | | | | 1,950 | |
| Currier Rd | Rte 151 | Hooppole Rd | NA | | | | | | | | | 2,200 | |
| Degrasse Rd | Red Brook Rd | Great Neck Rd South | 8/94 | M | 365 | 2:15PM | 39 | 1.00 | 365 | 39 | 20 | 2,200 | 0.018 |
| Donna's Lane | Rte 28 | Great Neck Rd South | 7/94 | C | 2,228 | 11AM | 257 | 1.00 | 2,228 | 257 | 25 | 2,200 | 0.117 |
| Great Neck Rd North | rotary | Lowell Rd | 6/94 | C | 7,718 | 5PM | 633 | 1.16 | 8,953 | 734 | 21-44 | 2,325 | 0.316 |
| Great Neck Rd North | Lowell Rd | Rte 130 | 8/94 | V | 11,610 | 4:45PM | 1,035 | 1.00 | 11,610 | 1,035 | 24-25 | 2,325 | 0.445 |
| Great Neck Rd South | rotary | Donna's Ln | 9/91 | O | 8,184 | (7) | 630(8) | 1.24 | 10,148 | 630 | 30 | 2,325 | 0.271 |
| Great Neck Rd South | Donna's Ln | Red Brook Rd | 6/94 | C | 5,496 | 2PM | 424 | 1.16 | 6,375 | 492 | 24-30 | 2,325 | 0.212 |
| Great Oak Rd | Red Brook Rd | South Cape Beach | 8/94 | V | 3,021 | 3:15PM | 311 | 1.00 | 3,021 | 311 | 20-22 | 2,200 | 0.141 |
| Greensward Rd | Rock Landing Rd | Troon Way | NA | | | | | | | | | 1,950 | |
| Hooppole Rd | Currier Rd | Back Rd | 8/94 | M | 1,536 | 4PM | 137 | 1.00 | 1,536 | 137 | 20 | 1,950 | 0.070 |
| Job's Fishing Rd | Rte 151 | Rte 28 | 8/94 | M | 3,093 | 4:15PM | 284 | 1.00 | 3,093 | 284 | | 2,200 | 0.129 |
| Lovell's Ln | Rte 130 | Quashnet Rd | 8/94 | M | 231 | 3:15PM | 26 | 1.00 | 231 | 26 | 20 | 1,950 | 0.013 |
| Lowell Rd | Great Neck Rd North | Old Barnstable Rd | 8/94 | V | 2,973 | 4:30PM | 293 | 1.00 | 2,973 | 293 | 20 | 2,200 | 0.133 |
| Mashpee Neck Rd | Quinaquisset Ave | Town Landing | 4/86 | O | 1,069 | 12 noon | 95 | 1.47 | 1,571 | 140 | 20-22 | 2,200 | 0.063 |
| Meetinghouse Rd | Great Neck Rd North | Rte 28 | 8/94 | V | 938 | 10:15AM | 108 | 1.00 | 938 | 108 | 26 | 2,200 | 0.049 |
| Monomoscoy Rd | Red Brook Rd | Hamblins Pond | 8/94 | M | 1,849 | 5:30PM | 157 | 1.00 | 1,849 | 157 | 20-26 | 1,950 | 0.081 |
| Old Barnstable Rd | Rte 28 | Lowell Rd | 8/94 | M | 1,120 | 5PM | 100 | 1.00 | 1,120 | 100 | 17-25 | 2,200 | 0.045 |
| Old Barnstable Rd | Lowell Rd | Rte 151 | 6/94 | C | 3,154 | 4PM | 274 | 1.16 | 3,659 | 318 | 20-21 | 2,200 | 0.144 |
| Old Barnstable Rd | Rte 151 | Carriage Shop Rd (Fal) | 8/94 | V | 2,033 | 4:15PM | 214 | 1.00 | 2,033 | 214 | 20 | 2,200 | 0.097 |
| Orchard Rd | Rte 28 | Quinaquisset Ave | 8/94 | V | 1,444 | 7:15AM | 115 | 1.00 | 1,444 | 115 | 20 | 2,200 | 0.052 |
| Pimlico Pond Rd | Sandwich Town Line | Barnstable Town Line | 8/94 | M | 1,452 | 3PM | 160 | 1.00 | 1,452 | 160 | 20-21 | 2,200 | 0.073 |
| Quashnet Rd | Lovell's Ln | Great Neck Rd North | 8/94 | M | 375 | 5:30PM | 41 | 1.00 | 375 | 41 | 20 | 1,950 | 0.021 |
| Quinaquisset Ave | Rte 28 | Barnstable Town Line | 6/94 | C | 1,689 | 4PM | 151 | 1.16 | 1,959 | 175 | 22 | 2,200 | 0.080 |
| Red Brook Rd | Rte 28 (Fal) | Ostrum Rd (Fal) | 8/94 | V | 4,155 | 4:15PM | 343 | 1.00 | 4,155 | 343 | 26 | 2,325 | 0.148 |
| Red Brook Rd | Ostrum Rd (Fal) | Monomoscoy Rd | 8/94 | M | 3,529 | 3PM | 306 | 1.00 | 3,529 | 306 | 26 | 2,325 | 0.132 |
| Red Brook Rd | Monomoscoy Rd | Great Neck Rd South | 8/94 | M | 2,261 | 3:15PM | 234 | 1.00 | 2,261 | 234 | 26-30 | 2,325 | 0.101 |
| Rock Landing Rd | Wading Place Rd | Shore Dr | 8/94 | V | 5,504 | 4:15PM | 459 | 1.00 | 5,504 | 459 | | 2,200 | 0.209 |
| Rte 28 | Metoxit Rd (Fal) | Falmouth Town Line | 6/93 | C | 12,169 | 4PM | 1,015 | 1.16 | 14,116 | 1,177 | | 2,250 | 0.523 |
| Rte 28 | Falmouth Town Line | rotary | 7/93 | C | 16,478 | 5PM | 1,287 | 1.00 | 16,478 | 1,287 | | 2,250 | 0.572 |
| Rte 28 | rotary | Quinaquisset Ave | 7/94 | C | 29,820 | 4PM | 2,169 | 1.00 | 29,820 | 2,169 | | 2,250 | ***0.964*** |
| Rte 28 | Quinaquisset Ave | Barnstable Town Line | 6/94 | C | 19,656 | 4PM | 1,548 | 1.16 | 22,801 | 1,796 | | 2,250 | ***0.798*** |
| Rte 130 | Sandwich Town Line | Great Neck Rd North | 6/92 | C | 7,311 | 4PM | 675 | 1.15 | 8,408 | 776 | 22 | 2,250 | 0.345 |
| Rte 130 | Great Neck Rd North | Barnstable Town Line | 7/93 | C | 6,472 | 4PM | 512 | 1.00 | 6,472 | 512 | 22 | 2,250 | 0.228 |
| Rte 151 | Sandwich Rd (Fal) | Falmouth Town Line | 6/93 | C | 15,313 | 4PM | 1,337 | 1.16 | 17,763 | 1,551 | | 2,250 | 0.689 |
| Rte 151 | Falmouth Town Line | rotary | 7/94 | C | 19,065 | 6PM | 1,304 | 1.00 | 19,065 | 1,304 | 24-35 | 2,250 | 0.580 |

**Table 4-1**
**Road Inventory Data**

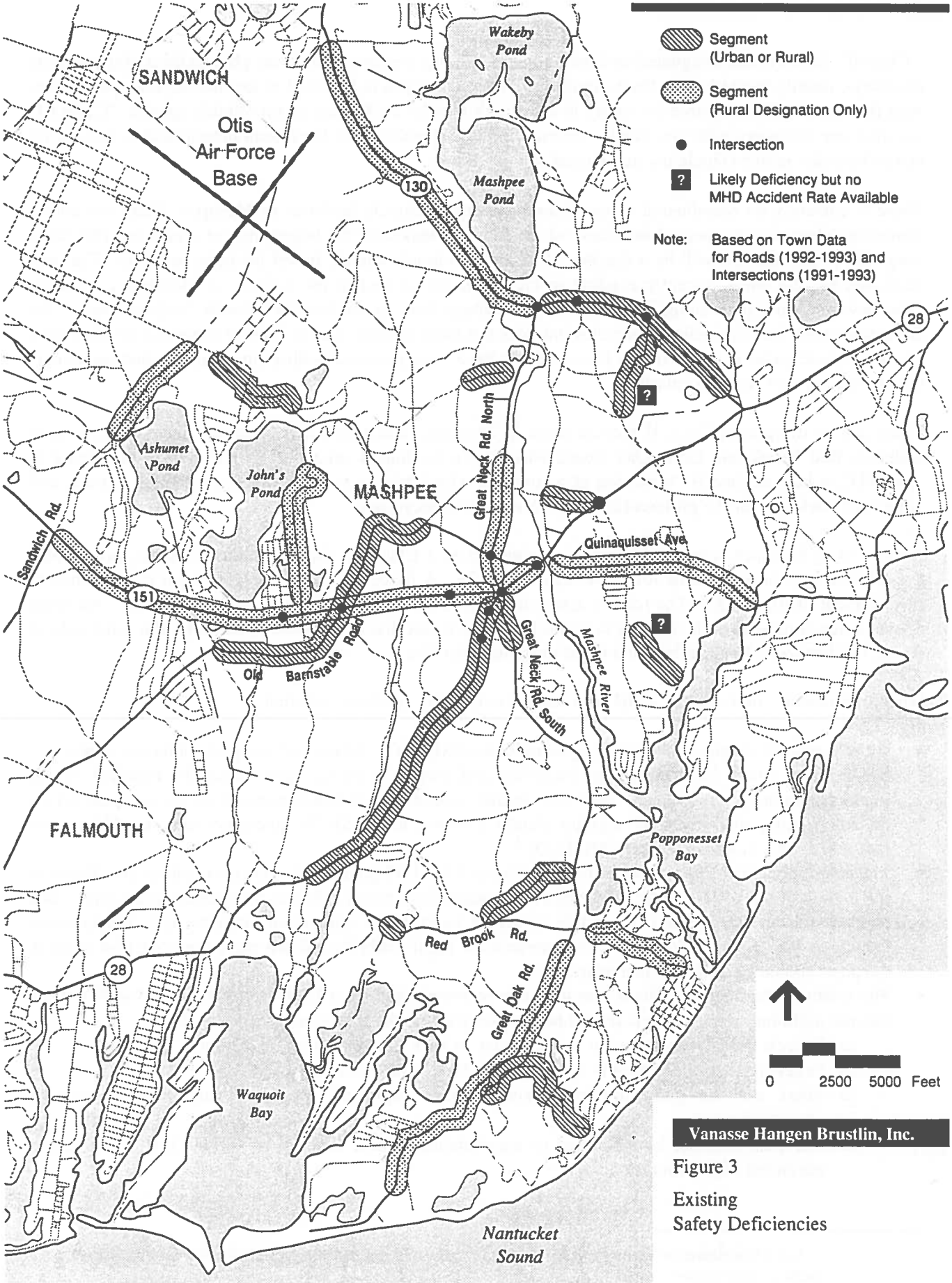
| Road | From | To | Most Recent Weekday Count: Date | By(1) | 24 Hr Vol | Pk Hr starting @ | Pk Hr Vol | Seasonal Factor(2) | Summer ADT(3) | Summer Pk Hr | Pvmt Width(4) | Hourly Capacity(5) | Summer Volume/ Capacity(6) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sampson's Mill Rd | Rte 28 | Barnstable Town Line | 8/94 | M | 494 | 4PM | 56 | 1.00 | 494 | 56 | 18-20 | 1,950 | 0.029 |
| Sandwich Rd | Falmouth Town Line | South Outer Rd | 6/93 | C | 2,969 | 4PM | 329 | 1.16 | 3,444 | 382 | | 2,200 | 0.173 |
| Shore Dr | Wading Place Rd | Rock Landing Rd | NA | | | | | | | | | 1,950 | |
| Simon's Narrows Rd | Mashpee Neck Rd | Quaker Run Rd | NA | | | | | | | | 20 | 1,950 | |
| South Sandwich Rd | Cotuit Rd | Rte 130 | 7/94 | C | 3,598 | 5PM | 358 | 1.00 | 3,598 | 358 | 20-22 | 2,200 | 0.163 |
| Sunset Strip | Rte 130 | Noisy Hole Rd | NA | | | | | | | | 20-24 | 1,950 | |
| Troon/Walton Heath Ways | Greensward Rd | Great Oak Rd | NA | | | | | | | | | 1,950 | |
| Uncle Percy's Rd | Wading Place Rd | Rock Landing Rd | NA | | | | | | | | | 1,950 | |
| Wading Pl/Red Brook Rds | Great Neck Rd South | Shore Dr | 8/94 | V | 2,240 | 11AM | 216 | 1.00 | 2,240 | 216 | | 2,200 | 0.098 |

(1) C=Cape Cod Commission, V=VHB, M=Mashpee, O=other
(2) based on data from Cape Cod Commission
(3) July/August; ADT = average daily traffic
(4) from VHB pavement management study
(5) estimated based on Highway Capacity Manual procedures
(6) 0.80 or above considered to be deficient (bold & shaded), 0.70 - 0.79 considered marginally deficient (shaded)
(7) information not available
(8) 1989 summer data from CCC's "Route 28 Traffic Circulation Study"

**Table 4-2**
**Intersection Inventory Data**

| Intersection | Most Recent Weekday Count: Date | By(1) | PM Pk Hr starting @ | Entering Volumes: Vehicles | Peds | Bikes | PM Peak Hour: Reserve Capacity(2) | LOS(2) | Source & Analysis Year |
|---|---|---|---|---|---|---|---|---|---|
| Rte 28 @: | | | | | | | | | |
| --Metoxit Rd (Fal) | 8/94 | V | 4:45PM | 1,593 | 3 | 2 | 115 | D | Flynn--Quashnet Woods ('88) |
| --Red Brook Rd (Fal) | 8/94 | V | 4PM | 1,486 | 1 | 3 | -27 | F | CCC--Rte. 28 Study ('89) |
| --Industrial Dr | 8/94 | M | 4:30PM | 1,399 | 0 | 0 | | | |
| --Deer Crossing | | | | | | | | | |
| --Shellback | 7/91 | O | | 1,512 | | | 6 | E | Vanasse--Mashpee Commons ('91) |
| --Job's Fishing Rd/Donna's Ln | 7/91 | O | | 1,660 | | | 46 | E | Vanasse--Mashpee Commons ('91) |
| --Steeple St | 7/91 | O | | 1,787 | | | -79 | F | Vanasse--Mashpee Commons ('91) |
| --Pine Tree Rotary | 7/91 | O | | 3,218 | | | v/c=0.66(3) | B | Vanasse--Mashpee Commons ('91) |
| --Quinaquisset Ave | 7/91 | O | | 1,896 | | | -51 | F | Vanasse--Mashpee Commons ('91) |
| --Meetinghouse Rd | 8/94 | V | 4PM | 1,860 | 0 | 1 | 97 | E | DJK--Meetinghouse Village ('90) |
| --Asher's Path/Orchard Rd | 8/94 | V | 4:15PM | 2,146 | 0 | 3 | 118 | D | BSC--Fox Run ('86) |
| --Noisy Hole Rd | 8/94 | M | 4:45PM | 1,804 | 0 | 3 | 82 | E | DJK--Meetinghouse Village ('90) |
| --Cape Dr | 8/94 | V | 4:15PM | 1,752 | 5 | 1 | 231 | C | BSC--Fox Run ('86) |
| Rte 130 @: | | | | | | | | | |
| --Cotuit Rd | 8/93 | O | 4:45PM | 636 | 1 | | | | |
| --South Sandwich Rd | 8/94 | M | 4:15PM | 779 | 0 | 9 | | | |
| --Great Neck Rd North | ?/92 | O | | 1,431 | | | | | |
| Rte 151 @: | | | | | | | | | |
| --Sandwich Rd (Fal) | 8/92 | V | 4PM | 1,399 | | | 0 | F | |
| --Currier Rd (Fal) | 8/94 | V | 4:15PM | 1,811 | 3 | 2 | | | |
| --James Cir/Winslow's Rd | 8/94 | V | 4:30PM | 1,515 | 1 | 1 | | | |
| --Ninigret Ave | 8/94 | V | 4:30PM | 1,579 | 2 | 2 | | | |
| --Algonquin Ave | 8/94 | V | 4:30PM | 1,632 | 1 | 2 | | | |
| --Old Barnstable Rd | 7/91 | O | | 1,648 | | | 12 | E | Vanasse--Mashpee Commons ('91) |
| --Job's Fishing Rd | 7/91 | O | | 1,395 | | | 46 | E | Vanasse--Mashpee Commons ('91) |
| --Market St | 7/91 | O | | 1,703 | | | 30 | E | Vanasse--Mashpee Commons ('91) |
| Great Neck Rd North @: | | | | | | | | | |
| --Meetinghouse Rd | 8/93 | O | 4:45PM | 821 | 1 | | | | |
| --Quashnet Rd | 8/94 | M | 4:45PM | 1,015 | 0 | 11 | | | |
| --Lowell Rd | 8/93 | O | 4:45PM | 828 | 0 | | | | |
| --Old Barnstable Rd | 7/91 | O | | 655 | | | 397 | B | Vanasse--Mashpee Commons ('91) |
| Great Neck Rd South @: | | | | | | | | | |
| --Donna's Ln | 7/91 | O | | 883 | | | 207 | C | Vanasse--Mashpee Commons ('91) |
| --Red Brook Rd/Great Oak Rd | 8/94 | V | 4PM | 343 | 1 | 1 | | | |

| Table 4-2 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Intersection Inventory Data | | | | | | | | | | |
| | | | | | | | | | | |
| | Most Recent Weekday Count | | | | | | | PM Peak Hour | | |
| | | | PM Pk Hr | Entering Volumes | | | | Reserve | | |
| Intersection | Date | By(1) | starting @ | Vehicles | Peds | Bikes | | Capacity(2) | LOS(2) | Source & Analysis Year |
| Old Barnstable Rd @: | | | | | | | | | | |
| --Carriage Shop Rd (Fal) | 8/94 | V | 4:30PM | 460 | 1 | 1 | | | | |
| --Hayway Rd (Fal) | 8/94 | V | 4:30PM | 504 | 1 | 4 | | | | |
| --Lowell Rd | 8/94 | M | 4:45PM | 357 | 0 | 1 | | | | |
| Quinaquisset Ave @: | | | | | | | | | | |
| --Orchard Rd/Mashpee Neck Rd | 8/94 | M | 5PM | 467 | 0 | 5 | | 814 | A | BSC--Fox Run ('86) |
| Red Brook Rd @: | | | | | | | | | | |
| --Ostrum Rd (Fal) | 8/94 | M | 4:30PM | 282 | 2 | 8 | | | | |
| --Monomoscoy Rd | 8/94 | M | 5PM | 242 | 2 | 20 | | | | |
| Rock Landing Rd @: | | | | | | | | | | |
| --Wading Place Rd | 8/94 | M | 4PM | 630 | 1 | 3 | | | | |
| (1) V=VHB, M=Mashpee, O=Other | | | | | | | | | | |
| (2) based on previously available information for most critical movement | | | | | | | | | | |
| (3) analyzed as a series of weaving sections | | | | | | | | | | |




**Vanasse Hangen Brustlin, Inc.**

Figure 3

Existing
Safety Deficiencies

"Class II" facilities are designated and specially marked bicycle lanes which are physically contiguous with roadways, usually located along their shoulders. Minimum width is four feet in low traffic, low speed areas, with increased widths required for safety in areas with heavier traffic and motor vehicle speeds. "Class III" facilities are roadways with low traffic volumes and low speeds which have been determined to be safe for mixed bicycle / motor vehicle use and signed as bike routes.

There is currently no coordinated or continuous system of bicycle facilities in Mashpee. There are only a limited number of disconnected facilities, which can be considered the beginnings of a network that has a long way to go before it will be a feasible alternative to motor vehicle travel for most residents. The only dedicated bicycle paths currently existing in the Town are located in the vicinity of Mashpee Commons. (The new multi-use path along Route 130 from Heritage Park to the Stratford Ponds condominium at the Barnstable town line is usable by bicycles but does not meet current state or federal standards for dedicated Class I bicycle paths.) None of the bicycle paths have been provided with proper signage and none meet the current ten foot width standard.

There are no designated Class II bicycle lanes in Mashpee, although wider shoulders have recently been added to Red Brook and Great Oak Roads which have facilitated safer use by bicyclists. According to AASHTO, a bicycle lane is "a portion of a roadway which has been designated by striping, signing, and pavement markings for the preferential or exclusive use of bicyclists."

Route 130 in Mashpee was, until recently, designated as a Class III "bicycle route" between Great Neck Road North and the Barnstable town line near Route 28. A bicycle route sign was present at both ends of this segment of Route 130. The road is approximately 22 feet wide and has no paved shoulders. As noted above, a new multi-use path, varying in width from 5 to 8 feet, has been constructed along the south side of Route 130 between Heritage Park and the Barnstable town line.

Safety deficiencies indicated by VHB with respect to existing facilities included:

- Bicycle-related signage is deficient (generally non-existent). Where bicycle paths intersect roadways, STOP signs should be installed for bicyclists and bicycle warning signs should be installed on the intersecting road prior to the crossing. Crosswalks should be installed to connect the bicycle path across the intersecting roadway. All signing should conform to AASHTO guidelines and the *Manual on Uniform Traffic Control Devices* (MUTCD).[1]
- The posts at entrances to bicycle paths do not meet AASHTO guidelines. One post (rather than three) in the middle of the path is sufficient to prevent unauthorized motor vehicles from entering the path. The post should be lockable and removable to permit entrance by authorized vehicles (e.g., maintenance vehicles). The post should also be reflectorized for night visibility. When more than one post is used, the posts should be at least 5 feet apart.
- The width of the bicycle paths is less than that recommended by AASHTO (10 feet). AASHTO states that the minimum width (8 feet) should be used only where the following conditions prevail:
  - ⇒ Bicycle traffic is expected to be low, even on peak days or during peak hours,
  - ⇒ Pedestrian use of the facility is not expected to be more than occasional,
  - ⇒ There will be good horizontal and vertical alignment providing safe frequent passing opportunities,
  - ⇒ The path will not be subjected to maintenance vehicle loading conditions that would cause pavement edge damage.

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[1] U.S. Department of Transportation, Federal Highway Administration (FHWA), *Manual on Uniform Traffic Control Devices* , 1988.

Data on current usage of these bicycle paths by bicyclists and pedestrians are not available. However, VHB felt that pedestrian use of the facilities can be expected to be more than occasional and peak use by bicyclists will most likely increase, and therefore recommended that these and other new bicycle paths should be constructed to the full 10-foot width wherever feasible.

- The separation of several Mashpee bicycle paths from roadways is less than that recommended by AASHTO (5 feet). AASHTO also recommends maintaining a minimum 2-foot-wide graded area adjacent to a bicycle path that is free of lateral obstructions. At the western end of the existing bicycle path along Old Barnstable Road, trees and other vegetation abut the path on the north side; also, a large metal post containing a flashing school speed limit sign abuts the path on the south side. Even though the roadway has a 100 foot wide layout, the path is separated from the road by a grass strip that is only 3 feet wide. Each of these deficiencies decreases the safety of path users.
- Drainage grate inlets are potential problems to bicyclists at several locations in Mashpee. Parallel bar grate inlets like those present at several locations on Old Barnstable Road can trap the front wheel of a bicycle and result in damage to the bicycle and / or injury to the bicyclist.
- Some of the existing bicycle paths connect to large parking areas of Mashpee Commons. Bicyclists are not provided any signing directing them to the bicycle paths or across the expansive parking lots.
  Roadway edge lines should be painted rather than thermoplastic to reduce bicyclist slippage when the road surface is wet.

Each of the safety and capacity deficiencies described above relates to existing facilities in Mashpee. However, if these deficiencies are corrected, the facilities are expected to be adequate for the growth in demand to 2004 or at buildout.

**Pedestrian Facilities**

The only existing sidewalks on Town roads in Mashpee are along portions of Great Neck Road North and Old Barnstable Road. A 3 to 4-foot-wide asphalt sidewalk abuts an asphalt curb along the west side of Great Neck Road North between Route 130 and Lowell Road. At one location, the path branches around several large trees, but a 3-foot width is maintained on both branches. An existing asphalt sidewalk on Great Neck Road North between Old Barnstable Road and the Super Stop and Shop is 4 feet wide and is separated from the road by about 15 feet. There is no curb on this section of the road. A 4-foot-wide asphalt sidewalk is also present along Old Barnstable Road between TCB Mashpee Village and Route 151. The sidewalk is separated from the road by a 4-foot-wide grass buffer. The latter two sidewalks meet requirements of the Americans with Disabilities Act (ADA), which requires new or reconstructed sidewalks to have a minimum unobstructed width of 4 feet. As part of the construction of the new high school, a sidewalk has been extended from the school to the intersection of Route 151 and Old Barnstable Road and a crosswalk established across Route 151 to the previously mentioned Old Barnstable Road sidewalk to TCB Mashpee Village

Crosswalks are also present at the intersection of Route 130 and Great Neck Road North. No pedestrian crossing signs are present in advance or at the locations of the crosswalks here or elsewhere in town. Several locations where existing sidewalks or bicycle paths intersect and cross roadways are lacking crosswalks. The few sidewalks and bicycle paths on Town roads in Mashpee do not constitute a complete or effective transportation network to meet the demands of pedestrians in Mashpee. In most parts of town, adults and children must walk along narrow roadways with little or no space available to them. On Great Neck Road North and South, which has relatively high volumes of traffic, posted speed limits as high as 50 miles per hour and poor sight distance at many locations, the Town has posted warning signs that read: "Pedestrians in Road". These conditions make walking extremely unsafe. Many other roadways in town present similar difficulties to pedestrians.

## Transit

Alone on the Cape except for Chatham, Mashpee is not served by any private intercity bus routes. Residents and visitors must travel to downtown Hyannis, downtown Falmouth, Buzzards Bay or the commuter parking lot at the Sagamore rotary in Bourne to catch a bus to Boston or other off-Cape points. The **Plymouth & Brockton (P&B) Street Railway Co.** runs frequent (approximately 15) bus trips daily between Hyannis, Sagamore and Boston (including Logan Airport). They also provide a connecting service (currently three trips a day) between Hyannis and Provincetown. **Bonanza Bus Lines, Inc.** provides approximately eight trips per day between Woods Hole, Falmouth, Buzzards Bay and Boston, as well as six trips per day between Hyannis, Buzzards Bay, Providence and New York, connecting with the Woods Hole - Boston route at Buzzards Bay.

**The Cape Cod Regional Transit Authority** (CCRTA) operates the "**Sea Line**", a fixed-route bus service linking the Steamship Authority docks in Woods Hole and Barnstable Village. The bus runs Monday through Saturday with six trips daily in each direction. Ridership has been increasing annually since the bus service was initiated in 1985. In 1996, ridership totaled 33,753 one-way trips (up steadily from 15,575 in 1985), which is approximately 100 one-way passenger trips daily; 2605 passengers boarded in Mashpee (up from 253 in 1985), which equates to about 10 one-way passenger trips per day. (See Table 4-5.)

The SeaLine connects with the P&B and Bonanza bus services at the Hyannis and Falmouth bus stations and to the Steamship Authority ferry docks at Woods Hole (for service to Martha's Vineyard) and Hyannis (for service to Nantucket). However, connection times do not appear to be well coordinated. Buses are wheelchair accessible and run through Mashpee between 6:30 a.m. and 7:00 p.m., with roughly two hours between runs.

**TABLE 4-5 CCRTA TRANSIT RIDERSHIP**

| | *SeaLine* | | *b-Bus* | |
|---|---|---|---|---|
| Fiscal Year | Mashpee | Total | Mashpee | Total |
| 96 | 2605 | 33753 | 9258 | 223822 |
| 95 | 2838 | 37810 | 8140 | 208789 |
| 94 | 2627 | 29333 | 6015 | 195629 |
| 93 | 2169 | 27308 | 6384 | 182099 |
| 92 | 1233 | 23491 | 6423 | 172174 |
| 91 | 1082 | 22736 | 5977 | 172807 |
| 90 | 761 | 21723 | 4998 | 171065 |
| 89 | 512 | 19932 | 5077 | 179450 |
| 88 | 263 | 16390 | 4652 | 161149 |
| 87 | 419 | 13535 | 3989 | 140873 |
| 86 | 427 | 16246 | 3792 | 136867 |
| 85 | 253 | 15575 | 3574 | 134683 |
| 84 | | | 3960 | 138835 |

In addition to its scheduled fixed-route SeaLine, the Transit Authority also operates the "**b-Bus**" demand-responsive transit service. The b-Bus mini-buses provide door-to-door public transportation service to any location on Cape Cod (although focused on trips to the Hyannis area) as well as medical trips to the Boston area. Riders must make reservations for service via telephone at least one day in advance. Service is provided Monday through Friday from 8 a.m. to 7 p.m., Saturday from 9 a.m. to 5 p.m. and Sunday from 9 a.m. to 1 p.m.

During 1995 and 1996, local transit services were offered in Mashpee under a federal Congestion Management and Air Quality (CMAQ) grant, which required a 20% local match. The *"Mashpee Trolley"* service operated two trolley buses on a number of routes. During the summer of 1995, five routes were operated, with a hub at Mashpee Commons where transfers were scheduled to and from the SeaLine. The 1995 routes ran to Johns Pond Park, North Mashpee (Santuit Pond Estates), South Cape Beach, Summerfield Park (Mashpee Industrial Park) and East Mashpee (Cape Drive) and carried 3727 passengers from June 24 to September 4. The East Mashpee route was eliminated for the summer of 1996 (replaced by the Orchard Rd. / Quinaquisset Ave. diversion of the SeaLine service), the Summerfield Park route was cut back to Deer Crossing and the North Mashpee route was revised to eliminate a one-way loop. Ridership increased to 4278 in 1996, or 60 riders per day. However, given the number of hours of service provided, that came to only 2.3 one-way trips per hour.

During the summer of 1997, the trolley was run from June 21 to Labor Day. The John's Pond route was eliminated, with the Santuit Pond - Mashpee Commons - South Cape Beach route modified slightly by diverting to TCB Mashpee Village and the High School. Ridership was again very disappointing.

During the off-season, from late December 1995 through mid-January, 1997 (excluding the summer months of Mashpee Trolley service), the Transit Authority operated the *"Mashpee Circulator"*, using one van-on-chassis vehicle similar to those formerly used for the SeaLine. Seven round trips were run on the North Mashpee route and six on an abbreviated Johns Pond route that terminated at Johns Pond Estates. 3241 passengers were carried, with monthly ridership increasing gradually from 347 in January 1996 to 420 in October. The service was terminated in January 1997 due to poor ridership and the expiration of federal grant funding.

### Other Services

The **Mashpee Council on Aging** owns a handicapped-accessible van purchased with a state Small Cities Program grant. The van, which carries two wheelchairs and eight other seated passengers, is used for medical, nutrition, social / recreational, educational and shopping trips by Mashpee handicapped persons and seniors. Frequent destinations include medical appointments, Falmouth and Cape Cod Hospitals, the Cape Cod Mall, Main Street in Hyannis, Falmouth Mall and Christmas Tree Shop in Falmouth, Wal-Mart in Wareham, Mashpee Commons, Deer Crossing and Independence Mall in Kingston. During 1997, the van carried 2846 one-way passenger trips. Riders must be registered, with 103 registered during 1997.

**Falmouth Hospital** operates a courtesy van that will pick persons up at their home for transportation to the hospital or to its community medical centers in Mashpee Commons or Sandwich.

Mashpee has licensed one metered **taxi** service, All Village Taxi, which provides day and night service, along with the associated All Town Limousine Service. In addition, Leslee's Taxi & Limousine service is licensed to provide flat rate limousine service, including trips to Logan Airport and T. F. Green Airport in Rhode Island.

## *Traffic Projections*

Chapter 5 describes traffic projections developed by the consultant for three points in the future: the summer of 2004, a theoretical far-off summer when the town is fully "built out" under current zoning rules and an alternative future summer when the town is built out according to the recommendations of this Comprehensive Plan. Projected trip tables are contained in Appendix B of the full plan.

## *Roadway Capacity Deficiencies*

Chapter 6 of the plan describes roadway "link" and intersection capacity and safety deficiencies which are projected to occur under each of the traffic projection scenarios and identifies theoretically required roadway and intersection improvements needed to move traffic reasonably well under each scenario. Some of the findings, such as a projected need for six lanes on Routes 28 and 151 and four on Route 130 and Great Neck Road under the current zoning scenario, are frightening and point out the necessity of both reducing the overall level of potential development in the town and finding ways to convince residents to use alternatives to motor vehicle transportation. Figures 4, 5 and 9 illustrate roadways expected to suffer from capacity deficiencies in 2004 and at "buildout" of the town. Tables 6-5 and 6-6 indicate required roadway cross-sections to deal with link capacity deficiencies according to VHB's analysis. Table 6-7 indicates necessary intersection improvements and costs in 2004 and at buildout.

## *Roadway Improvement Options*

Chapter 7 identifies the options that can be considered to deal with projected roadway and intersection deficiencies and contains fairly detailed recommendations that recognize the constraints on our ability to continue to build and expand roads. It includes recommendations for more limited road widenings than theoretically required, use of "annual average" rather than summer peak hour traffic as a guide for roadway projects, the construction of new roadway links to relieve pressure on existing main roads and provide alternative routes for local traffic, a number of intersection improvements and the use of "roundabouts" rather than signals at certain intersections to improve intersection capacity and safety and the appearance of the community.

Constraints to roadway construction and widening include limited right-of-way widths in some areas, historic structures that might be impacted, street trees whose removal could have a significant negative impact on community character, environmental factors such as water bodies and wetlands and threatened or endangered species and, not insignificantly, cost.

As opposed to those improvements identified as necessary by VHB, the Plan recommends the following improvements:

**Route 28: The ultimate buildout configuration of Route 28 should be that of an undivided four lane roadway with 4 foot shoulders, except where additional turn lanes are required** to maintain safety or achieve adequate capacity at intersections, or where medians are added for traffic safety or aesthetic reasons or to provide pedestrian refuges in the potentially densely developed area of Mashpee Commons. In the latter case, **a landscaped median having a width of at least twelve feet is suggested between Donna's Lane and the rotary**. These widenings should only be constructed as actual traffic growth demands, not in advance of projected traffic, and only after other non-auto alternative measures and more limited intersection improvements are implemented.

It is also recommended that **parallel roadways to Route 28** be developed, along with **bypass roads** around the Mashpee rotary area, before widening all of Route 28 to four travel lanes is considered. Their intent is to reduce traffic on Route 28 and the rotary by avoiding the need for use of Route 28 to make trips between adjoining properties which front on the highway and by providing alternative routes for local traffic and to allow local residents a means of avoiding summer congestion on the main roads.

Route 28 has a 60 foot wide layout through Mashpee, except for slightly wider sections near the rotary and at Noisy Hole Road. That layout could accommodate four lanes of traffic with four foot shoulders (totaling

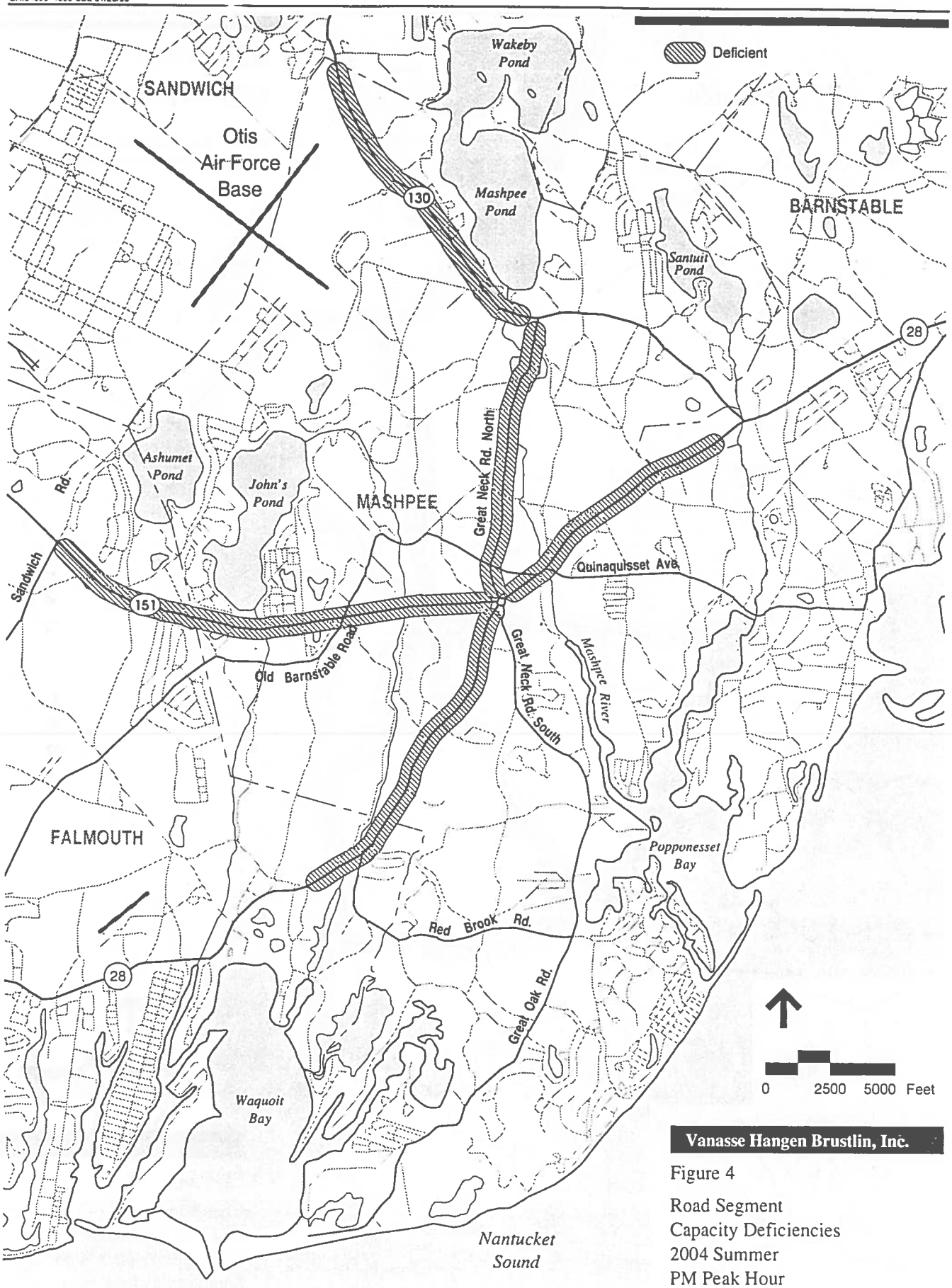


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Figure 4

Road Segment
Capacity Deficiencies
2004 Summer
PM Peak Hour

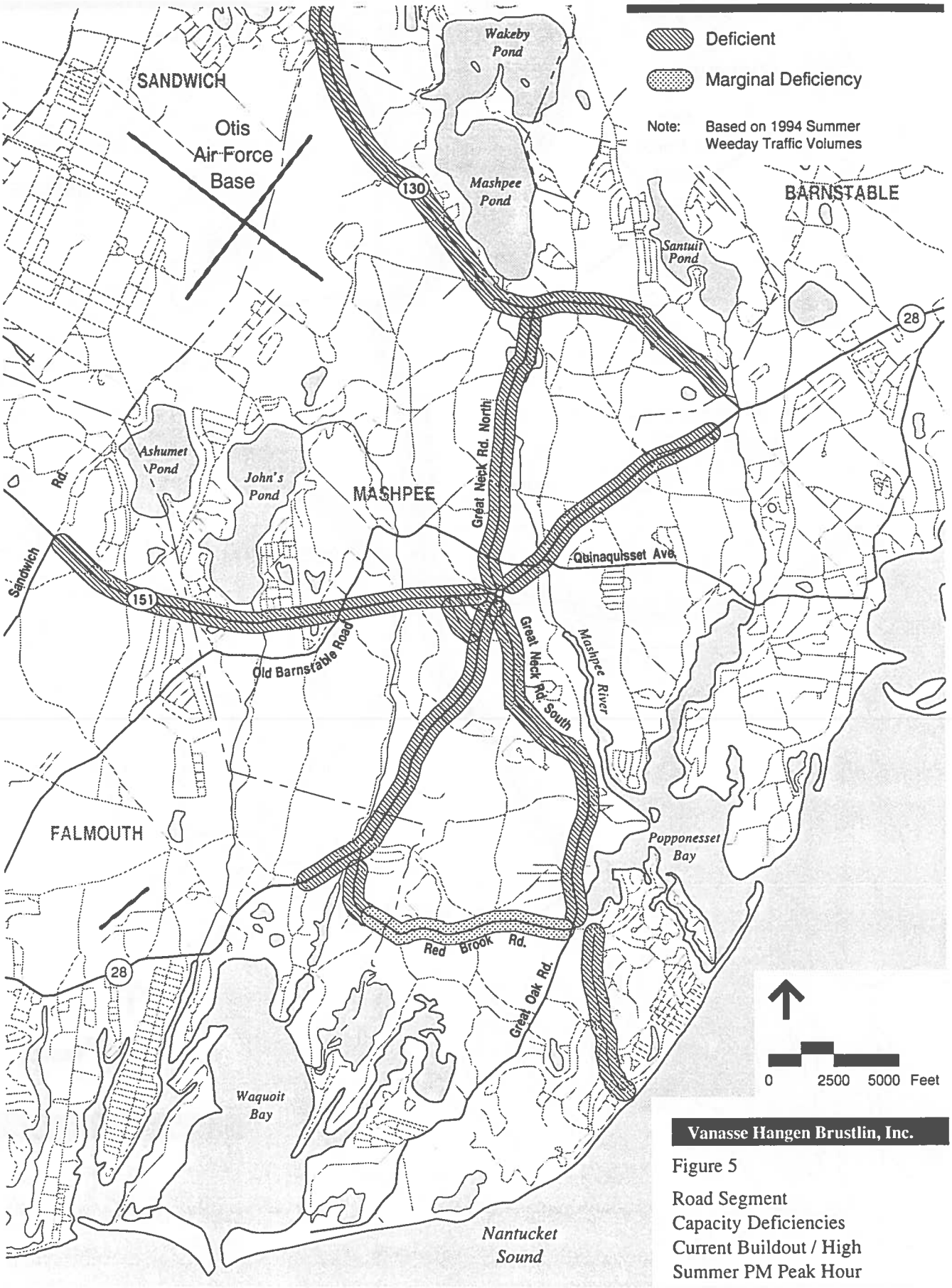


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Figure 5

Road Segment
Capacity Deficiencies
Current Buildout / High
Summer PM Peak Hour

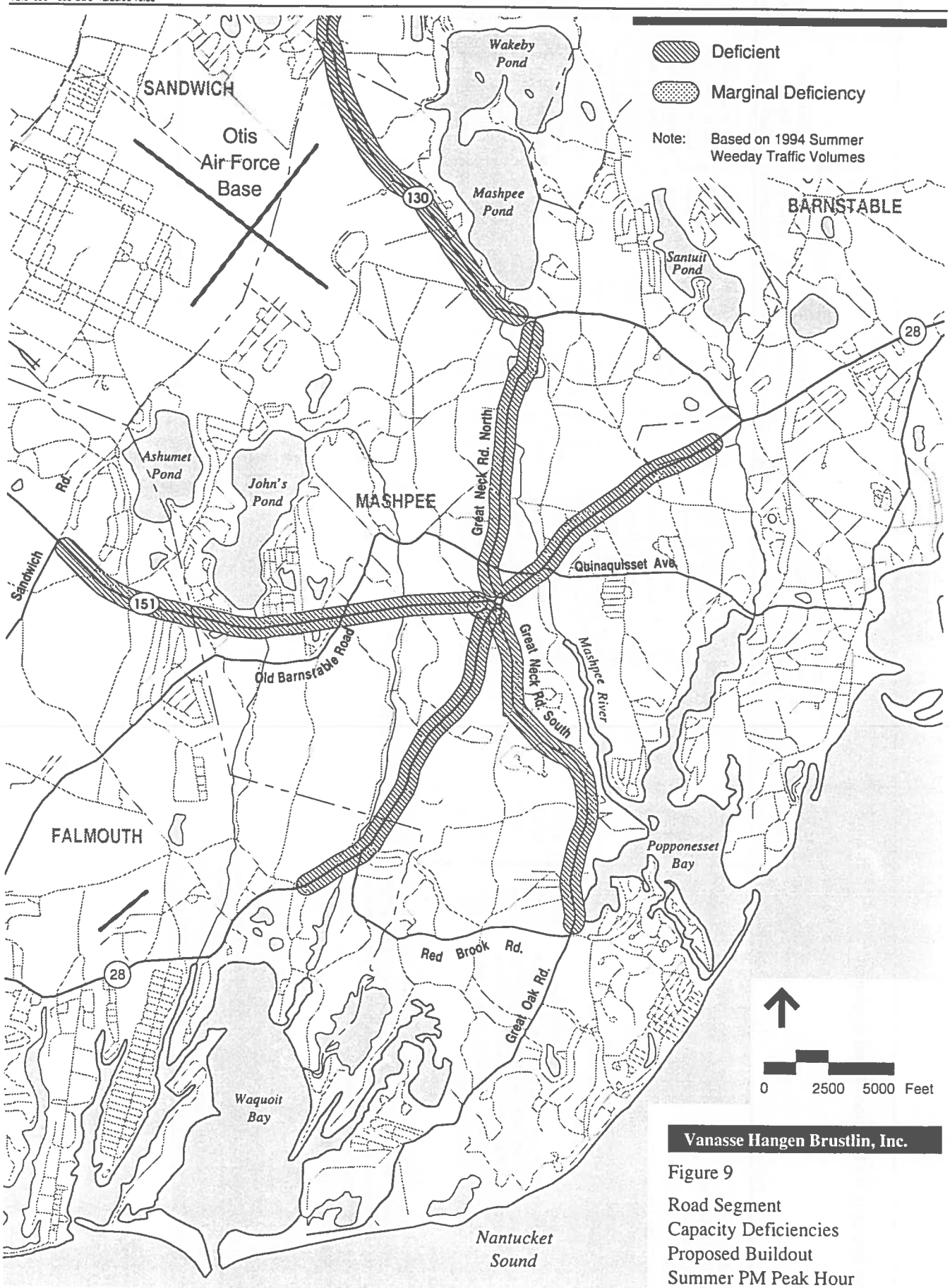


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Figure 9

Road Segment
Capacity Deficiencies
Proposed Buildout
Summer PM Peak Hour

**Table 6-5**

**Required Cross Sections for Deficient Road Segments**

| Road | From | To | Existing Hourly Capacity(1) | 10-year Buildout (2004) Estimated Summer Volume(1) | Volume/ Capacity(2) | Peak-direction Volume(3) | Required Cross-Section(4) | Mitigated Volume/ Capacity | Current Buildout (2020) Estimated Summer Volume(1) | Volume/ Capacity(2) | Peak-direction Volume(3) | Required Cross-Section(4) | Mitigated Volume/ Capacity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Great Neck Rd North | rotary | Lowell Rd | 2,325 | 1,932 | 0.83 | NA | upgraded 2-lane | 0.77 | 3,932 | 1.69 | 2,163 | 4-lane undivided | 0.76 |
| Great Neck Rd North | Lowell Rd | Rte 130 | 2,325 | 2,441 | 1.05 | NA | upgraded 2-lane | 0.98(5) | 4,833 | 2.08 | 2,658 | 4-lane undivided | 0.93(5) |
| Great Neck Rd South | rotary | Donna's Ln | 2,325 | 1,364 | 0.59 | NA | existing 2-lane | | 2,995 | 1.29 | 1,647 | 4-lane undivided | 0.58 |
| Great Neck Rd South | Donna's Ln | Red Brook Rd | 2,325 | 1,087 | 0.47 | NA | existing 2-lane | | 3,553 | 1.53 | 1,954 | 4-lane undivided | 0.69 |
| Job's Fishing Rd | Rte 151 | Rte 28 | 2,200 | 870 | 0.40 | NA | existing 2-lane | | 1,772 | 0.81 | NA | existing 2-lane(5) | |
| Red Brook Rd | Rte 28 | Ostrum Rd | 2,325 | 535 | 0.23 | NA | existing 2-lane | | 1,865 | 0.80 | NA | existing 2-lane(5) | |
| Rock Landing Rd | Wading Place Rd | Shore Dr | 2,200 | 669 | 0.30 | NA | existing 2-lane | | 2,203 | 1.00 | NA | upgraded 2-lane | 0.88(5) |
| Rte 28 | Metoxit Rd (Fal) | Falmouth Town Line | 2,250 | 2,957 | 1.31 | 1,626 | 4-lane undivided(6) | 0.57 | 5,890 | 2.62 | 3,240 | 4-lane divided | 1.01(5) |
| Rte 28 | Falmouth Town Line | rotary | 2,250 | 3,022 | 1.34 | 1,662 | 4-lane undivided(6) | 0.58 | 5,081 | 2.26 | 2,795 | 4-lane undivided | 0.98(5) |
| Rte 28 | rotary | Quinaquisset Ave | 2,250 | 4,588 | 2.04 | 2,523 | 4-lane undivided | 0.89(5) | 7,444 | 3.31 | 4,094 | 6-lane undivided | 0.95(5) |
| Rte 28 | Quinaquisset Ave | Barnstable Town Line | 2,250 | 4,065 | 1.81 | 2,236 | 4-lane undivided | 0.78 | 7,106 | 3.16 | 3,908 | 6-lane undivided(7) | 0.91(5) |
| Rte 130 | Sandwich Town Line | Great Neck Rd North | 2,250 | 1,840 | 0.82 | NA | existing 2-lane(5) | | 3,810 | 1.69 | 2,096 | 4-lane undivided | 0.74 |
| Rte 130 | Great Neck Rd North | Barnstable Town Line | 2,250 | 949 | 0.42 | NA | existing 2-lane | | 1,944 | 0.86 | NA | upgraded 2-lane | 0.78 |
| Rte 151 | Sandwich Rd (Fal) | Falmouth Town Line | 2,250 | 3,957 | 1.76 | 2,176 | 4-lane undivided | 0.76 | 7,669 | 3.41 | 4,218 | 6-lane undivided | 0.98(5) |
| Rte 151 | Falmouth Town Line | rotary | 2,250 | 3,536 | 1.57 | 1,945 | 4-lane undivided | 0.68 | 6,679 | 2.97 | 3,673 | 6-lane undivided(7) | 0.85(5) |

(1) From "Projected Road Capacity Deficiencies" spreadsheets (Tables 8 and 9) (2-way capacity)

(2) 0.80 or above considered to be deficient; 0.70 - 0.79 considered marginally deficient (except in "growth centers")

(3) Based on 55%/45% directional split; NA = not applicable since multilane not required

(4) Capacities based on Highway Capacity Manual:

*Upgraded two-lane (two-way capacity)*

2,500 vph

*Multilane (one-way capacity)*

4-lane undivided = 2,700-3,000 vph; 4-lane divided = 3,000-3,400 vph;

6-lane undivided = 4,000-4,600 vph; 6-lane divided = 4,500-5,100 vph

(5) v/c greater than 0.80 but less than 1.05 assumed to be tolerable rather than going to next upgrade level; based on mid-level capacity value for multilane ranges

(6) Possibly also a 3-lane cross section, depending on left-turn volumes and patterns

(7) Possibly also a 5-lane cross section, depending on left-turn volumes and patterns

**Table 6-6**

**Required Cross Sections for Deficient Road Segments--Proposed Buildout**

| Road | From | To | Existing Hourly Capacity(1) | Proposed Buildout (2020) Estimated Summer Volume(1) | Volume/ Capacity(2) | Peak-direction Volume(3) | Required Cross-Section(4) | Mitigated Volume/ Capacity |
|---|---|---|---|---|---|---|---|---|
| Great Neck Rd North | rotary | Lowell Rd | 2,325 | 2,886 | 1.24 | 1,587 | 4-lane undivided(6) | 0.56 |
| Great Neck Rd North | Lowell Rd | Rte 130 | 2,325 | 3,604 | 1.55 | 1,982 | 4-lane undivided | 0.70 |
| Great Neck Rd South | rotary | Donna's Ln | 2,325 | 2,039 | 0.88 | NA | upgraded 2-lane | 0.82(5) |
| Great Neck Rd South | Donna's Ln | Red Brook Rd | 2,325 | 1,923 | 0.83 | NA | upgraded 2-lane | 0.77 |
| Rte 28 | Metoxit Rd (Fal) | Falmouth Town Line | 2,250 | 4,277 | 1.90 | 2,352 | 4-lane undivided | 0.83(5) |
| Rte 28 | Falmouth Town Line | rotary | 2,250 | 4,094 | 1.82 | 2,252 | 4-lane undivided | 0.79 |
| Rte 28 | rotary | Quinaquisset Ave | 2,250 | 5,925 | 2.63 | 3,259 | 4-lane divided | 1.02(5) |
| Rte 28 | Quinaquisset Ave | Barnstable Town Line | 2,250 | 5,438 | 2.42 | 2,991 | 4-lane undivided | 1.05(5) |
| Rte 130 | Sandwich Town Line | Great Neck Rd North | 2,250 | 2,767 | 1.23 | 1,522 | 4-lane undivided(6) | 0.53 |
| Rte 151 | Sandwich Rd (Fal) | Falmouth Town Line | 2,250 | 5,529 | 2.46 | 3,041 | 4-lane divided | 0.95(5) |
| Rte 151 | Falmouth Town Line | rotary | 2,250 | 4,783 | 2.13 | 2,631 | 4-lane undivided | 0.92(5) |

(1) From "Projected Road Capacity Deficiencies" spreadsheet (Table 16) (2-way capacity)

(2) 0.80 or above considered to be deficient; 0.70 - 0.79 considered marginally deficient (except in "growth centers")

(3) Based on 55%/45% directional split; NA = not applicable since multilane not required

(4) Capacities based on Highway Capacity Manual:

*Upgraded two-lane (two-way capacity)*

2,500 vph

*Multilane (one-way capacity)*

4-lane undivided = 2,700-3,000 vph; 4-lane divided = 3,000-3,400 vph;

6-lane undivided = 4,000-4,600 vph; 6-lane divided = 4,500-5,100 vph

(5) v/c greater than 0.80 but less than 1.05 assumed to be tolerable rather than going to next upgrade level; based on mid-level capacity value for multilane ranges

(6) Possibly also a 3-lane cross section, depending on left-turn volumes and patterns

Table 6-7

**Preliminary Improvement Proposals and Costs at Deficient Intersections\2004 and Proposed Buildout**

| Intersection | 2004 Summer PM Peak Hour(1) Suggested Improvements | 2004 Summer PM Peak Hour(1) Construction Cost ($1,000s)(2) | Proposed Buildout/Summer PM Peak Hour Additional Improvements | Proposed Buildout/Summer PM Peak Hour Construction Cost ($1,000s)(2) |
|---|---|---|---|---|
| Rte 28 @: | | | | |
| --Metoxit Rd (Falmouth) | 2L Metoxit NB & SB approaches, LTL Rte. 28 EB & WB, consolidate curb cuts | 35-50 | potential signalization | 60-80 |
| --Red Brook Rd/Martin Rd (Falmouth) | make Martin approaches 1-way away, 2L Red Brook NB approach, LTL Rte. 28 WB | 15-20 | if short-range measures require enhancement: reconfigure Martin accesses (consider closure since both have alternate access; otherwise, signalize to monitor flows) | 80-100 |
| --Industrial Dr | 2L Industrial & Industrial Extension approaches, LTL Rte. 28 EB & WB, signalize if warranted | 95-130 | signalize if not already done in short term, potential RTL Rte. 28 SB | 10-15 [60-95 with signal] |
| --Deer Crossing | make right-in/right-out only (both sides of Rte. 28), improve retail area access via Shellback Way | 3-5 | | |
| --Shellback Way | make 4-way intersection with retail across Rte. 28, signalize, 2L Shellback approach, LTL Rte. 28 NB & SB | 90-120 | | |
| --Job's Fishing Rd/Donna's Ln | signalize, 2L Jobs Fishing (existing) & Donna's approaches, LTL Rte. 28 NB & SB | 85-110 | potential RTL Rte. 28 NB & SB | 20-30 |
| --Steeple St | 2L Steeple EB (existing) & WB approaches | 25-30 | potential signalization, potential RTL Rte. 28 NB & SB | 100-125 |
| --Pine Tree Rotary | relocate Great Neck Road South to east, improve directional signing, eliminate commercial curb cuts | 10-20 | if short-range measures need enhancement: reconfigure into 4-way intersection (4L approaches Rte. 28 WB & NB & Rte. 151EB, 3L approach Great Neck Road North SB), signalize, coordinate timing with adjacent signals, | 475-575 |
| --Quinaquisset Ave | realign with relocated Meetinghouse, 2L Quinaquisset approach | 40-50 | | |
| --Meetinghouse Rd | realign slightly east for better visibility, signalize, 2L Meetinghouse approach, LTL Rte. 28 EB & WB (can eliminate LT restriction into realigned Quinaquisset) | 95-130 | | |
| --Asher's Path/Orchard Rd | signalize, 2L Orchard & Asher's approaches, LTL Rte. 28 EB & WB | 95-130 | | |
| --Noisy Hole Rd | realign Sampsons Mill to Noisy Hole, signalize if warranted, 2L Noisy Hole & Sampsons Mill approaches, LTL Rte. 28 EB & WB, make original Sampsons Mill segment 1-way away if cannot delete | 95-130 | signalize if not already done in short term | [60-80 if necessary] |
| --Cape Dr | none | | | |
| Rte 130 @: | | | | |
| --Cotuit Rd | reconfigure to T intersection, 2L Cotuit approach, LTL Rte.130 EB | 35-45 | align Cotuit with Emma Oakley Mills Dr (approved but not-yet constructed subdivision street) to make 4-way intersection, potential signalization | 80-100 |
| --South Sandwich Rd | straighten & align with future Noisy Hole Rd. extension, 2L S Sandwich approach, LTL Rte. 130 EB | 35-45 | 4-way intersection if Noisy Hole Rd. is extended, potential signalization | 60-80 |

| Table 6-7 | | | | |
|---|---|---|---|---|
| **Preliminary Improvement Proposals and Costs at Deficient Intersections\2004 and Proposed Buildout** | | | | |
| | **2004 Summer PM Peak Hour(1)** | | **Proposed Buildout/Summer PM Peak Hour** | |
| **Intersection** | **Suggested Improvements** | **Construction Cost ($1,000s)(2)** | **Additional Improvements** | **Construction Cost ($1,000s)(2)** |
| --Great Neck Rd North | reconfigure geometry (T intersection, 2L Great Neck approach, LTL Rte. 130 WB, RTL Rte. 130 EB), signalize, consolidate driveways | 140-170 | provide 4L Rte. 130 (west leg only) as part of segment widening | 45-55 |
| Rte 151 @: | | | | |
| --Sandwich Rd (Falmouth)(3) | signalize, 2L approaches Rte. 151 EB & WB & Sandwich NB 1L Sandwich SB approach | 480 | | |
| --Currier Rd (Falmouth) | 2L Currier approaches, LTL Rte. 151 EB & WB | 30-40 | potential signalization | 60-80 |
| --James Cir/Winslow's Rd | LTL Rte. 151 EB & WB | 15-20 | | |
| --Ninigret Ave | 2L Ninigret approach (existing), LTL Rte. 151 EB | 10-15 | | |
| --Algonquin Ave | 2L Algonquin approach, LTL Rte. 151 EB | 15-20 | potential signalization | 60-80 |
| --Old Barnstable Rd(4) | signalize, 2L Old Barnstable approaches, LTL Rte. 151 EB & WB, relocate mobile home access drive | 300-350 | | |
| --Job's Fishing Rd(4) | realign with police/fire drive, signalize, extend Jobs Fishing to Old Barnstable, 2L Jobs Fishing approaches (NB existing), LTL Rte. 151 EB & WB, RTL Rte. 151 EB | 140-160 | | |
| --Market St/N. Market St | add through lane on Rte. 151 EB & WB | 35-45 | monitor/modify intersection as dictated by developing traffic flows; coordinate signal with reconfigured intersection at former rotary (if rotary is reconstructed) | |
| Great Neck Rd North @: | | | | |
| --Meetinghouse Rd | reconfigure to T intersection, 2L Meetinghouse approach, widen & pave shoulder on Great Neck SB | 40-45 | provide 4L Great Neck as part of segment widening | 15-20 |
| --Quashnet Rd | eliminate dual spur roads between Quashnet & Great Neck, reconfigure to T intersection, 2L Quashnet approach, widen & pave shoulder on Great Neck NB | 75-90 | provide 4L Great Neck as part of segment widening | 15-20 |
| --Lowell Rd(4) | reconfigure to T intersection & channelize, 2L Lowell approach, widen & pave shoulder on Great Neck NB, relocate bus stop & provide turnout | 60-70 | provide 4L Great Neck as part of segment widening | 15-20 |
| --Old Barnstable Rd | 2L Old Barnstable approach, flashing beacon | 25-30 | potential signalization if Great Neck Road South is relocated around former rotary & extended to Old Barnstable | 60-80 |
| Great Neck Rd South @: | | | | |
| --Donna's Ln | signalize, 2L Donna's approach, LTL Great Neck NB, RTL Great Neck SB | 85-110 | | |
| --Red Brook Rd (south)/Great Oak Rd/Red Brook Rd (north) | 2L Red Brook approaches (north & south), align Great Oak with Great Neck & eliminate STOP sign on Great Oak | 15-20 | | |
| Old Barnstable Rd @: | | | | |
| --Carriage Shop Rd (Falmouth) | none | | | |
| --Hayway Rd (Falmouth) | 4-way STOP control | 2-3 | | |

Table 6-7

**Preliminary Improvement Proposals and Costs at Deficient Intersections\2004 and Proposed Buildout**

| Intersection | 2004 Summer PM Peak Hour(1) Suggested Improvements | 2004 Summer PM Peak Hour(1) Construction Cost ($1,000s)(2) | Proposed Buildout/Summer PM Peak Hour Additional Improvements | Proposed Buildout/Summer PM Peak Hour Construction Cost ($1,000s)(2) |
|---|---|---|---|---|
| --Lowell Rd/Great Hay Rd | reconfigure Old Barnstable/Great Hay segment to make Great Hay the primary road as Jobs Fishing Rd extension (2L Old Barnstable & Great Hay approaches); Old Barnstable/Lowell segment: 2L approaches on Lowell & Old Barnstable WB | 80-100 | | |
| Quinaquisset Ave @: | | | | |
| --Orchard Rd/Mashpee Neck Rd | align Orchard & Mashpee Neck legs & provide 2L on each side street approach | 30-40 | potential signalization | 60-80 |
| Red Brook Rd @: | | | | |
| --Ostrum Rd (Falmouth) | make one-way flow around island, 2L Ostrum approach, relocate STOP sign and add a second STOP sign on island | 6-10 | | |
| --Monomoscoy Rd | reconfigure island & make one-way flow around island, 2L Monomoscoy approach, relocate STOP sign and add a second STOP sign on island | 10-15 | | |
| Rock Landing Rd @: | | | | |
| --Wading Place Rd | reconfigure island & make one-way flow around island, 2L Wading Place approach, relocate STOP sign on island to other side | 10-15 | | |

(1) two through lanes on Rte. 28 & 151 approaches, 1L otherwise; lanes stated in list are additional;
NB = northbound; EB = eastbound; SB = southbound; WB = westbound;
2L = two-lane; 4L = four-lane; RTL = right-turn lane; LTL = left-turn lane

(2) excluding right-of-way, design, construction-related services, etc.

(3) based on current VHB design project for town of Falmouth

(4) based on recent VHB concept plans for Mashpee High School project

56 feet of pavement) but would have trouble accommodating any further unpaved shoulders, side slopes, utilities, turn lanes, medians, bicycle lanes, sidewalks or bus turnouts. Because it is unlikely that the need for four lanes plus turn lanes can be ultimately avoided and because the other noted uses are also important, **20 to 40 feet of additional right-of-way width will have to be secured** along Route 28. This can be accomplished through purchase, through donation from abutting landowners, through traffic mitigation requirements on large abutting projects or through adoption of an "official map" under the provisions of Massachusetts General Laws Chapter 41, Sections 81-E through J. The latter provides a means of laying out and protecting future roadway rights-of-way by prohibiting the issuance of building permits within such layouts, subject to any injured party's rights to recover damages under M.G.L. Chapter 79. A mix of all four of these approaches is recommended to preserve and eventually acquire the additional right-of-way required for Route 28 improvements. In addition, **the Town should be very conservative in the approval of any front setback variances along Route 28** which would conflict with the public need for adequate roadway facilities or result in potential health or safety problems at such time as the road is widened.

It is recommended that within the next twelve years, the section of **Route 28 between Deer Crossing and Meetinghouse Road be increased to four lanes, that additional turn lanes be added at major intersections where necessary and that efforts begin immediately to preserve the needed right-of way for eventual widening of the remainder of the road to four lanes** at some future date if traffic requires and as funding permits. In addition, an effort should be made to **consolidate and reduce the number of driveways entering onto Route 28** to reduce points of conflict with left turning vehicles. **Prohibitions on left turns** from Route 28, as has been done at its intersection with Quinaquisset Avenue, or **physical and signage restrictions on left turns out of a site**, as at the Mashpee Commons entrance closest to the rotary, **should also be put into place where necessary** to reduce conflicting traffic moves. Finally, the installation of **traffic median barriers**, beyond the landscaped median near the rotary mentioned earlier, should be considered where they are the only potentially effective means of reducing left turn movements. If such medians are installed over large stretches, "jughandles" or other means of reversing direction at a signalized intersection should be developed.

**Mashpee Rotary and Alternate Routes:** In 1989, the Cape Cod Planning and Economic Development Commission produced a "*Route 28 Traffic Circulation Study - Mashpee Rotary Area*" for the state highway department which dealt with traffic problems on Route 28, Route 151 and the Mashpee rotary. It considered a variety of alternative reconfigurations of the rotary, including overpasses and signalization, recommending replacement of the rotary with a four-way signalized intersection and relocation of Great Neck Road South traffic to a new intersection east of the rotary as well as to a proposed street which will connect Great Neck Road South with Route 28 opposite the current "Steeple Street" entrance to Mashpee Commons. The report also recommended extending Jobs Fishing Road north across Route 151 past the police and fire stations to Old Barnstable Road.

At the same time, the Town's Rotary Bypass Study Committee strongly recommended the development of the Donna's Lane / Jobs Fishing Road Extension bypass route between Great Neck Road South and Old Barnstable / Lowell Roads. The state had also established a committee of local and state representatives to review and make recommendations on traffic problems along the "Mashpee Route 28 Corridor of Critical Concern" which supported the development of alternative routes and rotary bypasses, along with restrictions on left turns and a reduction in the number of driveway entrances.

In their report VHB, aware of local opposition to elimination of the rotary expressed at the "Vision Workshop" and of plans for a $250,000 landscaping upgrade at the rotary (which have since been shelved, at least temporarily), recommended postponing elimination of the rotary to the long term, rather than making the change during the next ten years. They agreed, however, that our greatest traffic need, both in the short-term as well as over the long-range period, is to provide east-west traffic relief on Routes 28 and 151,

particularly in the area of the rotary, and adopted most of the Commission's recommendations. VHB also suggested that it would be desirable to align the relocated Great Neck Road South segment so that it can be extended across Route 28 to meet Old Barnstable Road, creating a four-way signalized intersection with Route 28. Except for the reconfiguration of the rotary to a four-way intersection, VHB recommended that these bypass connector roads, which would be two lanes wide in their basic configuration, with additional turning lanes at intersections as required, be constructed in the short term (by 2004).

VHB recommended that additional bypass or connector roads also appear to be warranted. These include a new commercial street parallel to Route 28 between Industrial Drive and Donna's Lane / East Steeple Street, a short connection from this new street to Great Neck Road South opposite Amos Landing Road, a westerly / northerly extension of Industrial Drive across Route 28 to Whitings and Job's Fishing Roads, and an easterly extension of Industrial Drive to Great Neck Road South. VHB recommended that these be built in the short term.

This plan proposes a reduced version of the VHB recommendations. The construction of a **new commercial street parallel to Route 28 between Industrial Drive and East Steeple Street, a connection from that new street to Great Neck Road South** opposite Amos Landing Road and **an easterly extension of Industrial Drive to Great Neck Road** South is recommended to provide alternate routes for local traffic in the rotary area. (See Map 7-1) Based on VHB's cost estimates, these projects should cost $0.65-1.1 million, some of which would be funded privately as part of new development projects. In addition, **other connections should be established between existing and proposed developments in the rotary area** such as Deer Crossing, the proposed Talanian Realty shopping center (at the current flea market site) and the various neighborhoods of the Mashpee Commons project.

VHB's proposed westerly connection from Route 28 opposite Industrial Drive to Job's Fishing Road next to Homeyer Village via Whitings Road no longer appears necessary or feasible due to the recent approval of a 28 lot cluster subdivision on the west side of Route 28 in place of a previously approved 180 unit condominium project. Most of the Whitings Road route is now owned as conservation land by The Commonwealth of Massachusetts or the Town of Mashpee.

In addition, while it may be an option that should be kept open for further study, the relocation of Great Neck Road South to intersect Route 28 east of the rotary, and more particularly VHB's recommended further extension, via a signalized Route 28 intersection, north to Old Barnstable Road, is not recommended at this time. Except for a possible "metering" effect on traffic into the rotary, the resulting new intersection in the middle of our most heavily traveled roadway could create significantly more problems than it would solve. **Right-turn-only access to Route 28 from the Mashpee Commons "Trout Pond" neighborhood** could provide some alternate route relief for Great Neck Road South traffic heading east on Route 28 as well as access to that neighborhood without introducing the problems that left turns could cause on Route 28. Only similarly **restricted access to the properties on the north side of Route 28** in this area should be allowed, again to avoid left turn conflicts. In addition, **a barrier median in Route 28 between the rotary and Quinaquisset Avenue** should be considered to reinforce this left turn prohibition.

With regard to the rotary itself, a third alternative, at least for the foreseeable future (e.g. 20 years) is suggested. **Rather than eliminate the rotary totally** as suggested by the 1989 County study **or leave it as is** until eventual replacement by a four way signalized intersection in the "long term" as suggested by VHB, **the rotary could be reconfigured to operate as a modern "roundabout"**, an approach that has been very successfully employed in Europe, Australia, Florida, Maryland and Colorado and has been gaining increasing favor in a number of other states and some Massachusetts towns.

# Proposed New Road Connections

# Map 7-1

Unlike the traditional "traffic circle" or "rotary", which was usually built without benefit of design guidelines, the modern "roundabout" (see Figure 7-1), while looking a lot like the old rotary, is built to a specific set of standards designed to reduce travel speeds and increase safety while also maintaining, or increasing, traffic capacity. The primary design guideline relates to the angle at which vehicles are forced to approach the roundabout. A deflection at the entrance forces cars to slow down, while short flares at the entrance and wider circles are used to increase capacity. Whereas entry speeds to the Mashpee Rotary can easily reach 40 miles per hour, a roundabout is designed to limit speeds to less than 25 miles per hour. Such lower speeds mean shorter braking distances and longer decision making time. Therefore, it is easier to find a safe gap in traffic in which to enter the circle and, even if someone does make a mistake, collisions are easier to avoid. When collisions do occur, the impact is much lower due to lower speed and low angles of impact.

Roundabouts are much safer than unsignalized intersections and have been proven considerably safer than signalized intersections. They have achieved 50-90 percent reductions in collisions compared to equivalent intersections using 2 or 4-way stop signs or traffic signals. Fatal collisions are rare. The number of possible conflict points between vehicles (i.e. where vehicles' paths might theoretically be expected to cross) decreases from 24 at a four-way intersection to 4 at a roundabout (see Figure 7-2). Reduction in such conflict points reduces the number of resulting collisions. The lower speeds and angle of approach also avoid the situation where cars tend to speed up when they see a green light, then either can't stop when it turns red or are involved in a high speed, high impact right-angle collision with a car improperly entering on a red light from the cross street. High speed rear-end collisions are also reduced. In addition, at signalized or stop sign-controlled intersections, approximately 53 percent of all collisions involve left-turning vehicles, typically when a left-turning driver misjudges the available gaps in approaching traffic. Roundabouts, like rotaries, eliminate all left turns.

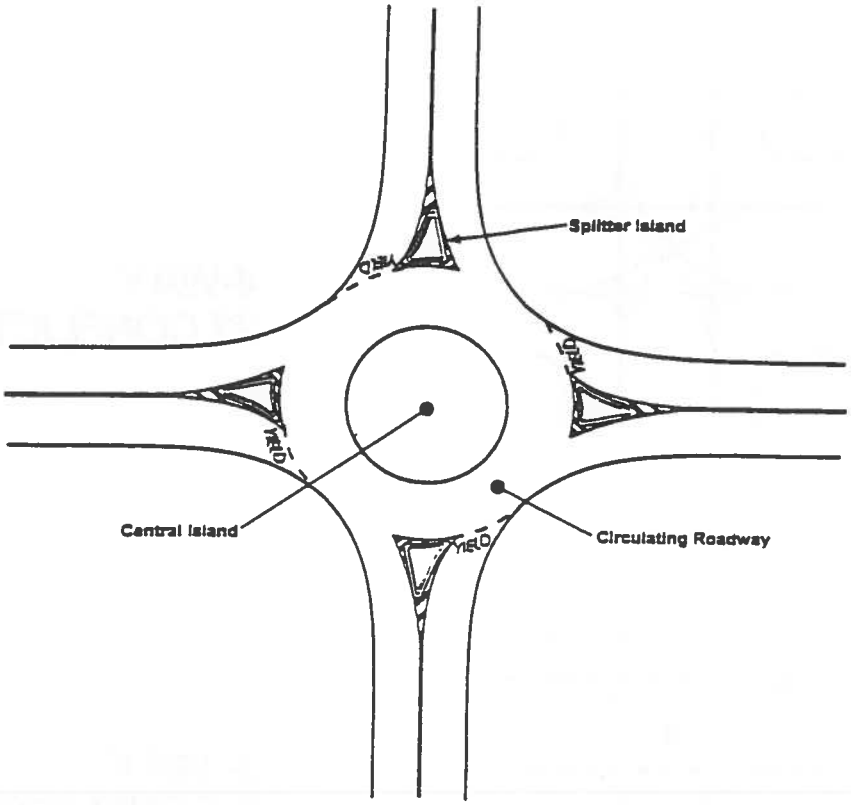
Roundabouts can also be less costly to construct than signalized intersections, unless they are very large. A typical signalized intersection can cost over $100,000 for the signals and signal engineering alone, plus additional large sums for roadway construction to add turn lanes and other improvements. In addition, a typical signal installation costs $3000 per year for electricity, maintenance of loops, controller, signal heads etc. When the Town of Barnstable sought bids for signalization at the intersection of Route 149 and Race Lane, the low bid was for $180,000. The Town then developed a roundabout design for the intersection that, according to the Barnstable Town Engineer, will cost $50,000 to implement. Construction of smaller roundabouts can cost only a few thousand dollars for minor streets in residential neighborhoods. Roundabout maintenance includes only periodic paving, occasional sign replacement and maintenance of any landscaping done within the central island. Even for larger, more expensive roundabouts, economic analysis which takes into account construction, operating, maintenance and collision costs for the economic life of each facility usually shows a higher benefit / cost ratio than traffic signals.

The traffic capacity of a roundabout will usually be higher than a signalized intersection because there are no yellow and red times (lost time). Vehicles can enter from each leg simultaneously, rather than some legs having to wait unnecessarily during traffic gaps that could have been used to enter the intersection. This benefit is especially apparent to Mashpee drivers in the off season who compare the ease of entry to the current rotary with the enforced waits at the new Route 151 / Market Street traffic signals.

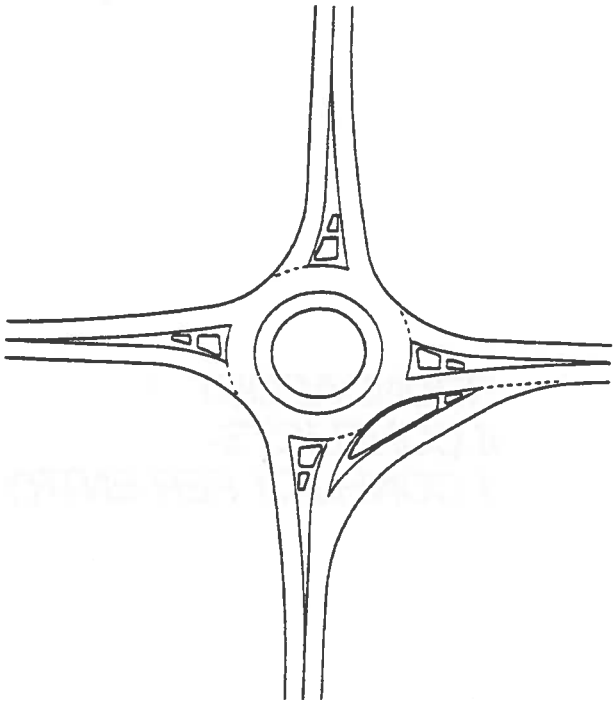
The latter example also illustrates the flexibility provided by the roundabout's self-regulating nature. Traffic volumes change from hour to hour, season to season and over the years as new development occurs. To provide optimum operation under those conditions, traffic signals need to be re-timed on a regular basis. As traffic volumes increase, additional intersection lanes may also need to be added so that the intersection capacity can approach that of the intersecting roadways. In contrast, the capacity of the roundabout already

# Potential Roundabout Configurations

# Figure 7-1

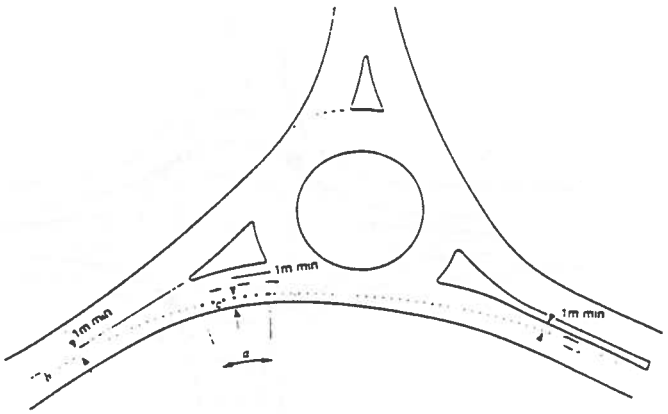



Basic roundabout.



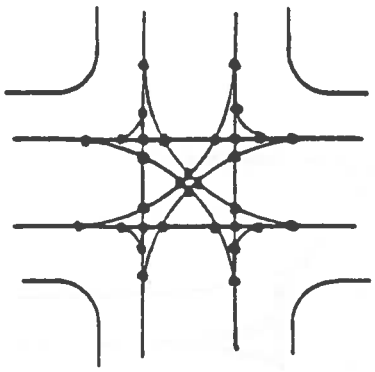
Roundabout with right-turn bypass lane.

Roundabout at a Y-intersection

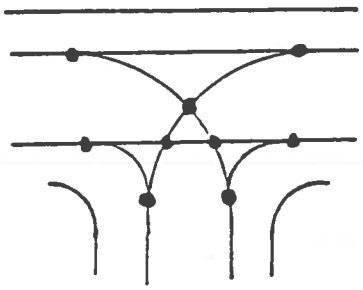


# Intersection Conflict Points

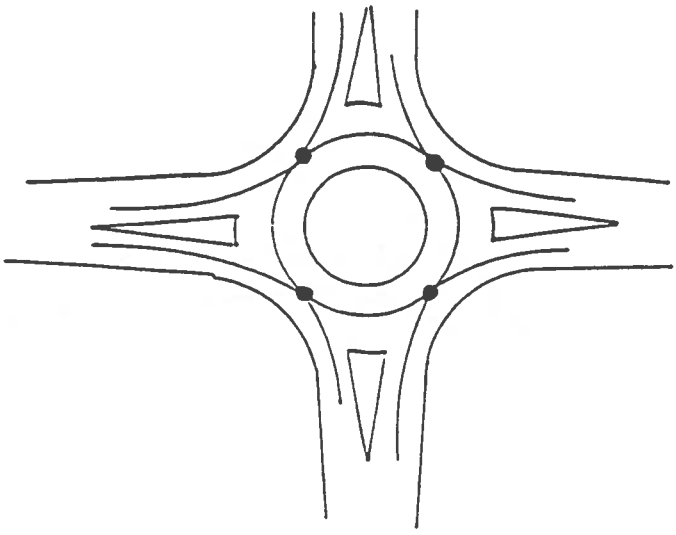
# Figure 7-2



*4-WAY*
*32 CONFLICTS*



*3- WAY*
*9 CONFLICTS*



*ROUNDABOUT*
*4 CONFLICTS-*
*1 CONFLICT PER ENTRY*

approaches the capacity of those roads. Therefore, once built, the roundabout's geometry stays the same except where the number of lanes on the intersecting roads is increased.

Two other benefits of roundabouts relate not so much to technical capacity and safety issues but to perceptions and appearances:

First, because they usually reduce the number of stops drivers have to make, compared with stop signs and signalized intersections, roundabouts can change drivers' perception of travel times. Psychological, as opposed to actual, trip time is perceived to be three times greater for a driver who is stopped rather than moving. Therefore, reduced stops translate to less driver frustration even if actual travel times are not changed.

Second, the appearance of a roundabout, particularly if attractively landscaped, can be a tremendous improvement aesthetically over a signalized intersection by eliminating the clutter of overhead wires and signal poles and by often allowing signage to be reduced. In addition, they can provide distinctive landmarks or entry points to a community or neighborhood, providing opportunities to create symbols of an area's identity and special character.

The use of roundabouts rather than signalization should also be considered for other Mashpee intersections. Appendix I to the full plan contains a variety of publications and guidelines further illustrating the function, design and benefits of modern roundabouts.

**Route 151:** Under summer peak "Current Buildout" conditions, VHB projected that traffic on Route 151 would be three times the roadway's current capacity. To meet that level of demand, they projected that the roadway would have to be widened to 5 or 6 lanes, undivided. As with Route 28, however, a four lane undivided cross section was adopted as a cap on road widening and included in the recommendations of VHB's final report as a project required to be completed by 2004.

As with Route 28, the reduction from 5-6 to four lanes undivided approximates the ultimate "Adjusted Buildout" shoulder season need as directed by Objective A. It is also consistent with the recommendations of the 1993 Falmouth Transportation Master Plan for widening of Route 151 to four lanes in Falmouth, particularly east of Sandwich Road.

In concurrence with VHB's recommendations and the Falmouth Transportation Master Plan, **this plan recommends that Route 151 be ultimately configured as a four lane undivided highway to accommodate "buildout" shoulder season traffic.** However, reconstruction of the entire roadway cannot and should not be accomplished by 2004 as suggested by VHB. Instead, incremental widening is suggested. That section of **Route 151 between Jobs Fishing Road and "Market Street" should be widened to four lanes by 2004** as part of the reconstruction and signalization of the Route 151 / Jobs Fishing Road / Jobs Fishing Road Extension (Police / Fire entrance road) intersection (see Section C). **Turn lanes should be added at the Route 151 / Old Barnstable Road intersection when it is signalized. That section of Route 151 between the Jobs Fishing Road and Old Barnstable Road intersections should be widened to three lanes by 2010**, with the center lane serving as a passing lane in the uphill directions on either side of the Quashnet River and then becoming a turn lane at each of those (future signalized) intersections. **Paved shoulders should be increased to at least 4, and preferably 6, feet along the entire length of Route 151 by 2010** to accommodate "Group A" bicyclists, to provide an emergency breakdown area (in conjunction with another 4-6 feet of graveled shoulder) and to allow temporary operation of an extra traffic lane during the Barnstable County Fair. Finally, **turn lanes should be provided as needed as part of** any other **intersection upgrades** identified for "buildout".

**Great Neck Road North and Alternate Routes:** VHB's buildout traffic projections indicated that, to handle summer peak hour traffic volumes, Great Neck Road North would have to be widened to four lanes, undivided. While there is sufficient right-of-way to accommodate such widening, there are significant topographic constraints in the form of steep slopes down to the Mashpee River and Washburn Pond, large street trees at the road's northern end and numerous residences and other structures in close proximity even to the current roadway. For those reasons and the more general impact on "community character", VHB and this plan do not recommend widening to four lanes. Instead, VHB recommended an upgraded two lane cross section for Great Neck Road North, including twelve foot travel lanes and four foot paved shoulders, along with the addition of left turn lanes at major intersections. Addition of turn lanes at significant intersections, which include the Ryan's Way and Old Barnstable Road intersections, would effectively result in a three lane cross section between the rotary and the Senior Center.

**This plan recommends widening to an upgraded two lane cross section**, as suggested by VHB **but configured with 11 foot travel lanes** as suggested by the JTC Desirable Minimums, **but with only 5 foot shoulders, for that portion of Great Neck Road south of the Lowell Road intersection.** Because of the topographic and "community_character" constraints noted above, **the section north of Lowell Road should either be left as-is, or be widened, where possible, only to provide 11 foot travel lanes and 2 foot paved shoulders**, rather than the VHB recommended, in conjunction with the widening of the existing sidewalk on the west side of the road to 5-8 feet to accommodate bicycles off the roadway. **Left turn lanes should be added at the Ryan's Way and Old Barnstable Road intersections**. A left turn lane should be constructed at the Lowell Road intersection only if there is major development along the west side of that road (which, it is hoped, will instead be purchased for inclusion in the Mashpee national Wildlife Refuge). **These improvements should be made incrementally before 2010 as part of intersection improvement projects and as a reconstruction of the roadway when it next requires repaving.**

Not constructing the additional two lanes on Great Neck Road North will result in inadequate traffic capacity even during the shoulder season. As a result, alternative routings were suggested which would provide another (roughly) parallel north-south travel corridor. These included developing or upgrading alternative through routes such as: Jobs Fishing Extension / Lowell Road / Ashers Path / Lovells Lane to Route 130, Meetinghouse Road / Goodspeed's Meetinghouse Road to Route 130 or Simons Road / Noisy Hole Road / Goodspeed's Meetinghouse Road to Route 130. VHB felt that the best alternative among these appeared to be the Meetinghouse Road alignment because of its location, the good condition of the majority of the corridor and fewer environmental and social impacts. However, there are unsafe intersections at each end of Meetinghouse Road due to poor sight distances. In addition, previous development proposals which would have increased traffic on Meetinghouse Road have met strong neighborhood resistance due to traffic concerns. Because of similar neighborhood concerns expressed at the Planning Board's April 15, 1998 public hearing on Plan amendments, the proposed Job's Fishing Extension bypass was dropped from the Plan.

Rather than place the burden of added through traffic on one neighborhood, **this plan recommends that a number of alternate routes be established to allow local traffic and emergency vehicles to avoid Great Neck Road North during periods of congestion**, including the second and third alternatives noted above, as well as other roadways which provide for an interconnected network of streets in the northern part of the town. Added traffic on each should be minimal if a number are developed and proper design can ensure that speeds are kept low and safety impacts avoided.

**Route 130:** VHB recommends increasing Route 130 to four lanes north of Great Neck Road North. Such a widening would be physically possible north of Asumet Road and would fit within the current 60 foot wide layout, but would create significant disruption to the existing historic center of town south of Ashumet

Road. In addition, it is questionable whether widening in Mashpee would make sense if, as seems likely, Route 130 is not similarly widened in the densely developed Forestdale section of Sandwich.

Rather than widen the entire section proposed by VHB, **this plan recommends that Route 130 north of Echo Road be upgraded to two twelve foot travel lanes with four foot paved shoulders** as is called for in the JTC Desirable Minimum Values for such rural minor arterials / urban extensions with travel speeds of 40 m.p.h. or more. **That widening might also be extended east to Lovell's Lane in the long term if traffic conditions warrant. No widening is recommended east of Lovell's Lane except for required turn lanes at intersections. Left turn lanes should be added as traffic volumes and safety warrant at the Ashumet Road, Echo Road, Pickerel Cove Road, Great Neck Road** (unnecessary if a roundabout is built), **South Sandwich Road** (also unnecessary if a roundabout is built), **Cotuit Road** (also unnecessary if a roundabout is built) **and Stratford Ponds intersections and at major commercial or industrial driveways. In addition, the creation of new driveways should be limited to the minimum possible, existing driveways should be consolidated where possible and adjacent commercially zoned land should be rezoned to prevent development of any large traffic generators.** These changes should be made incrementally as traffic and safety conditions warrant as part of repaving or intersection improvement projects over the next 10-20 years.

**Great Neck Road South:** As recommended by VHB, **Great Neck Road South should be improved to 12 foot travel lanes with four foot paved shoulders, along with left turn lanes as appropriate at significant intersections**, including Red Brook Road, Degrasse Road, the proposed extension of Industrial Drive, Amos Landing Road, Donna's Lane and the proposed East Steeple Street. The JTC Minimums suggest 11 foot lanes and 6 foot shoulders for this urban minor arterial where speeds exceed 40 m.p.h. and 10 foot lanes with 4 foot shoulders where they are below 40 mph. For most of this roadway, speeds average over 40 m.p.h. To provide for additional bicyclist safety, the Town might also consider striping the roadway to provide 11 foot travel lanes and five foot shoulders. Aside from the recommended turn lanes, the current roadway comes close to meeting the VHB proposed cross section, requiring only the widening of paved shoulders to four feet.

**Other Roadways:** Except for turn lanes at some intersections, no additional travel lanes are necessary on other Town roads, even under buildout conditions. However, based on the JTC Desirable Minimum Values tables, **travel lane widths should be upgraded to 12 feet with 4 foot shoulders on all rural minor arterials / urban extensions where speeds exceed 40 m.p.h., as well as on commercial or industrial access streets** where feasible, except as noted above, **to a minimum of 11 feet with 4 foot shoulders on rural minor arterials / urban extensions where speeds are below 40 m.p.h., to 11 feet with 6 foot shoulders on urban minor arterials where speeds are above 40 m.p.h., to 10 feet with 4 foot shoulders on urban minor arterials where speeds are below 40 m.p.h. and to a minimum of 12 feet combined lane and paved shoulder width on all urban collector streets** as identified in the functional classification system shown on Map 4-3. Greater widening of paved shoulders is also recommended on some roadways for bicycle facilities. **In order to facilitate bicycle use, the striping of the 12-foot lanes noted above as 11-foot lanes, allowing wider marked shoulder lanes, should also be considered.**

## Potential Intersection Improvements

VHB recommended a number of intersection improvements for both the next ten years and at buildout. Map 7-2 illustrates improvements proposed by the year 2004. Map 7-3 illustrates improvements recommended at "Proposed Buildout". Most of the improvements are at locations along the numbered routes (28, 130, and 151), as well as along other main travel routes such as Great Neck Road (North and South), Old Barnstable Road, Quinaquisset Avenue, Red Brook Road, and Rock Landing Road. Signalization, geometric

modifications, turning lanes, road realignments, and other Transportation Systems Management (TSM) measures are proposed.

In upgrading intersections, a coordinated approach is desirable whereby intersection improvements complement those proposed for the corresponding roadways. That is, the level of improvement for the road as a whole and for the intersections along the segment should be in approximate balance. In addition, a complementary program of travel demand reduction options will also have to be implemented to extend the efficiency and usefulness of any capacity improvements that are implemented. These are discussed in the next chapter.

Included by VHB as a potential long-term measure, as discussed previously, was converting the rotary to a four-leg signalized intersection as recommended in 1989 by the County. However, VHB recommended that such reconstruction be deferred as long as possible to allow monitoring of the effects of various new road connectors and extensions proposed in the rotary area. Deferral was also recommended for the following reasons:

- conversion represents a very significant and costly change with large aesthetic impacts,
- the rotary, as problematic as it may be, serves as a recognizable focal point for the community,
- signalization of the rotary would require three closely spaced signalized intersections which may cause more problems in actual practice than they solve in theory, particularly during peak summer weekend conditions,
- the various connector and extension roads proposed for the short-term may be sufficient to preclude the need for conversion of the rotary.

The Town concurs with VHB's recommendation but further suggests that the rotary be reconfigured under the design guidelines for a modern "roundabout", which could significantly improve its safety and extend its useful life with regard to traffic capacity.

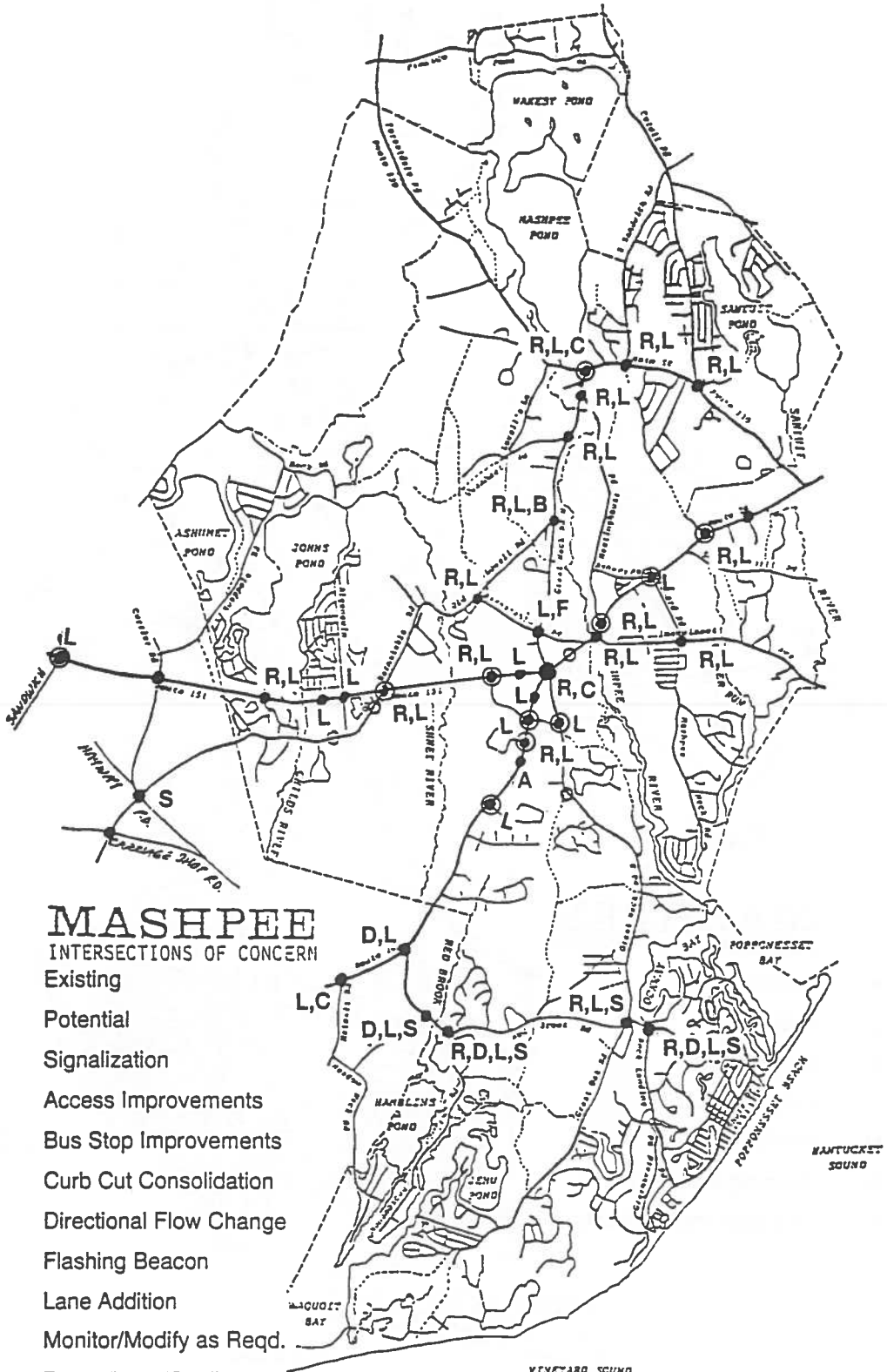
In addition, **while accepting VHB's recommendations for improvements at most of the intersections considered, it is recommended by this plan that the use of roundabouts be considered**, instead of VHB's proposals, **at a number of additional intersections**. Those intersections where such an approach appears to be particularly appropriate, having a reasonable balance between traffic flows on each leg, having current safety or traffic flow problems, being in areas where signals might be unattractive or overkill, and / or providing opportunities to maintain or create attractive community or neighborhood landmarks are the following:

- Route 130 / Great Neck Road North
- Route 130 / South Sandwich Road / Goodspeed's Meetinghouse Road
- Route 130 / Cotuit Road
- Jobs Fishing Road Extension / "Picabo Street" Extension
- Great Neck Road South / proposed "East Steeple Street" and Boch Center entrance
- Great Neck Road South / Donna's Lane
- Great Neck Road South / Red Brook Road / Great Oak Road
- Quinaquisset Ave / Mashpee Neck Road / Orchard Road
- Old Barnstable Road / Lowell Road
- Rock Landing Road / Wading Place Road

There may also be opportunities to use roundabout designs as a traffic calming measure and to avoid intersection backups in new developments such as Mashpee Commons and other large residential and commercial projects.

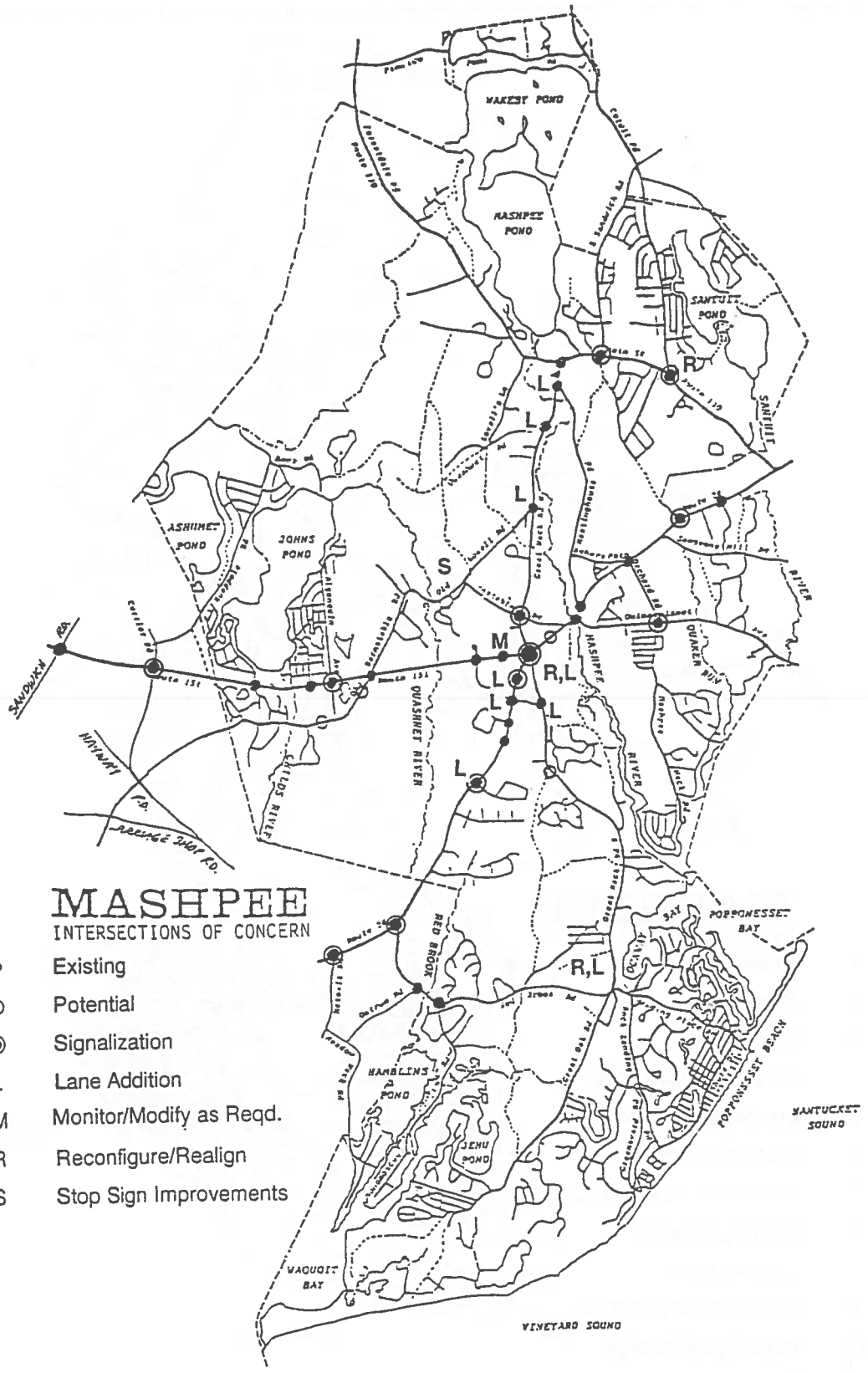
# Intersection Improvements - 2004

# Map 7-2



# Intersection Improvements - Buildout

# Map 7-3



One additional suggested change from the VHB recommended intersection designs is the intersection of Great Neck Road North and Meetinghouse Road. Very limited sight distances and high speeds on Great Neck Road make this a very dangerous intersection. **The Town should consider** acquiring the abandoned house and property located directly south of the intersection as part of land acquisitions suggested by the School Facilities plan for the next Town school site in order to allow **relocation of Meetinghouse Road to the crest of the hill on Great Neck Road located south of the current intersection.** The land on which the current road lies and the remainder of this lot could serve as a possible location for the north Mashpee fire station recommended by the Public Safety element.

## *Non-Roadway Options*

Chapter 8 identifies alternative non-roadway options for meeting our transportation needs. It includes a detailed plan for a network of bicycle facilities, recommendations for the development of pedestrian facilities and expanded transit services, a discussion of strategies to achieve trip reduction and a shift to alternative transportation modes and recommendations on how the Town can promote non-auto travel alternatives.

### Bicycles

While Mashpee does get some snow during most winters, the use of bicycles is possible for at least ten months of the year, if not longer. Particularly during the peak summer travel months, bicycles can be a serious alternative to automobile trips for some segments of the population, provided that adequate facilities are available and properly maintained between where people live and where they might want to go on a bicycle.

Traffic counts indicate that there are people who currently use bicycles to travel on our roadway system. However, the numbers are tiny compared to automobile trips on the same roadways, not surprising given the almost total lack of adequate bicycling facilities in the town.

At the same time, there has been consistent interest on the part of a large segment of local residents in the construction of a system of separate bicycle paths, as illustrated by the results of the 1992 public opinion survey conducted at the start of our Local Comprehensive Plan process. Fully 54% of survey respondents indicated that they would like to see more bike paths in Mashpee. 21% indicated that they sometimes use a bicycle to get to a destination in Mashpee, other than recreational biking.

In response to that interest, a number of attempts have been made over the years to establish bicycle paths. In 1977 the Town established a Bike Trails Committee, headed by the Recreation Director, which developed a master plan for bicycle paths. In the early 1980s, as part of an agreement between the Town and state regarding the establishment of South Cape Beach State Park, the state agreed to fund the construction of a separate bike path along Great Oak Road between Red Brook Road and South Cape Beach. To connect with that path, the Town's Department of Public Works developed plans to continue the bike path north along Great Neck Road South and Donna's Lane to Mashpee Commons and, via a bike path along Jobs Fishing Road which was to be constructed by the owners of Mashpee Commons, to a proposed bike path along the north side of Route 151 to Falmouth. 75% state funding was secured but, on a 63-56 favorable vote, the August 8, 1988 Special Town Meeting failed to come up with the 2/3 vote needed to bond the Great Neck Road South portion of the project, largely due to opposition from North Mashpee residents who were upset that their part of town was left out of the proposal. Subsequently, state fiscal problems resulted in a renegotiation of the Great Oak Road project down to a resurfacing of the roadway, which was able to include four foot paved shoulders, with no separate state-funded bike path.

1992 saw the Town's next attempt at developing bicycle facilities. Partly in response to the need to define in advance where bike paths should be located which might be funded by impact mitigation fees on Developments of Regional Impact required by the Cape Cod Commission, the Board of Selectmen adopted a Bike Route Plan in November, 1992. It included a comprehensive network of Class I bicycle paths as well as shoulder bike lanes and signed bike routes (see Map 8-1). Consistent with that plan, the Commission required that a number of bike paths be constructed as part of the "North Market Street" neighborhood of Mashpee Commons. In addition, a path was constructed by the state highway department between Mashpee Commons and Deer Crossing as part of a repaving project on Route 28.

In 1996, the Town began construction of a 5-8 foot wide multi-use (bikes, pedestrians) path along the south side of Route 130 between Heritage Park and the Barnstable town line. The path, which was initiated by the Board of Selectmen, was completed in 1997.

To assist in the development of this element of the Town's Comprehensive Plan, an ad hoc Bicycle Planning Subcommittee was established to provide public and biker input into the development of a comprehensive bicycle facility plan. The nine member Committee worked on the plan over a period of 18 months and voted in December, 1995 to recommend both a facility master plan (Map 8-2) and a prioritized list of proposed facilities improvements (Table 8-5).

The Subcommittee's work started with two basic items. The first was a map of the Town's roadway system differentiating roadways by traffic levels and speeds. The map identified an existing extensive system of low-traffic, low-speed subdivision streets which provide relatively safe bicycling for people of all ages and skill levels. Conversely, it illustrated where there were critical gaps in that system which had to be filled by new facilities of one sort or another. The second basic starting point for the Subcommittee was a realization that there are essentially three types of bicyclists, all with different skill levels and a need for different facilities to ensure their safety while bicycling. Mr. Paul Smith of VHB provided a formal breakdown of those three classes, as has been recognized nationally by bike planners and adopted by the Federal Highway Administration. The FHWA classifiations are illustrated in Table 8-1.

According to the FHWA, Group A bicyclists are best served by designing all roadways to accommodate shared use by bicycles and motor vehicles. This can be accomplished by:

- Establishing and enforcing speed limits to minimize speed differentials between bicycles and motor vehicles on neighborhood streets and/or by implementing "traffic-calming" strategies.[2]
- Providing wide outside lanes on collector and arterial streets built with an "urban section" (i.e., with curb and gutter).
- Providing usable (paved) shoulders on highways built with a "rural section" (i.e., no curb and gutter).

Group B/C bicyclists are best served by a network of neighborhood streets and designated bicycle facilities, which can be provided by:

- Ensuring neighborhood streets have low speed limits through effective speed enforcement or controls and/or by implementing "traffic calming" strategies.
- Providing a network of designated bicycle facilities (e.g., bicycle lanes, separate bicycle paths, or side-street bicycle routes) through the key travel corridors typically served by arterial and collector streets.
- Providing usable (paved) roadway shoulders on rural highways.

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[2] "Traffic calming" is a term used to denote measures typically employed to slow traffic on residential streets for increased safety. Examples include curved street alignments, neckdowns at intersections, diversionary bollards and islands, and speed bumps, among others.

# Selectmen's 1992 Bike Route Plan

# Map 8-1

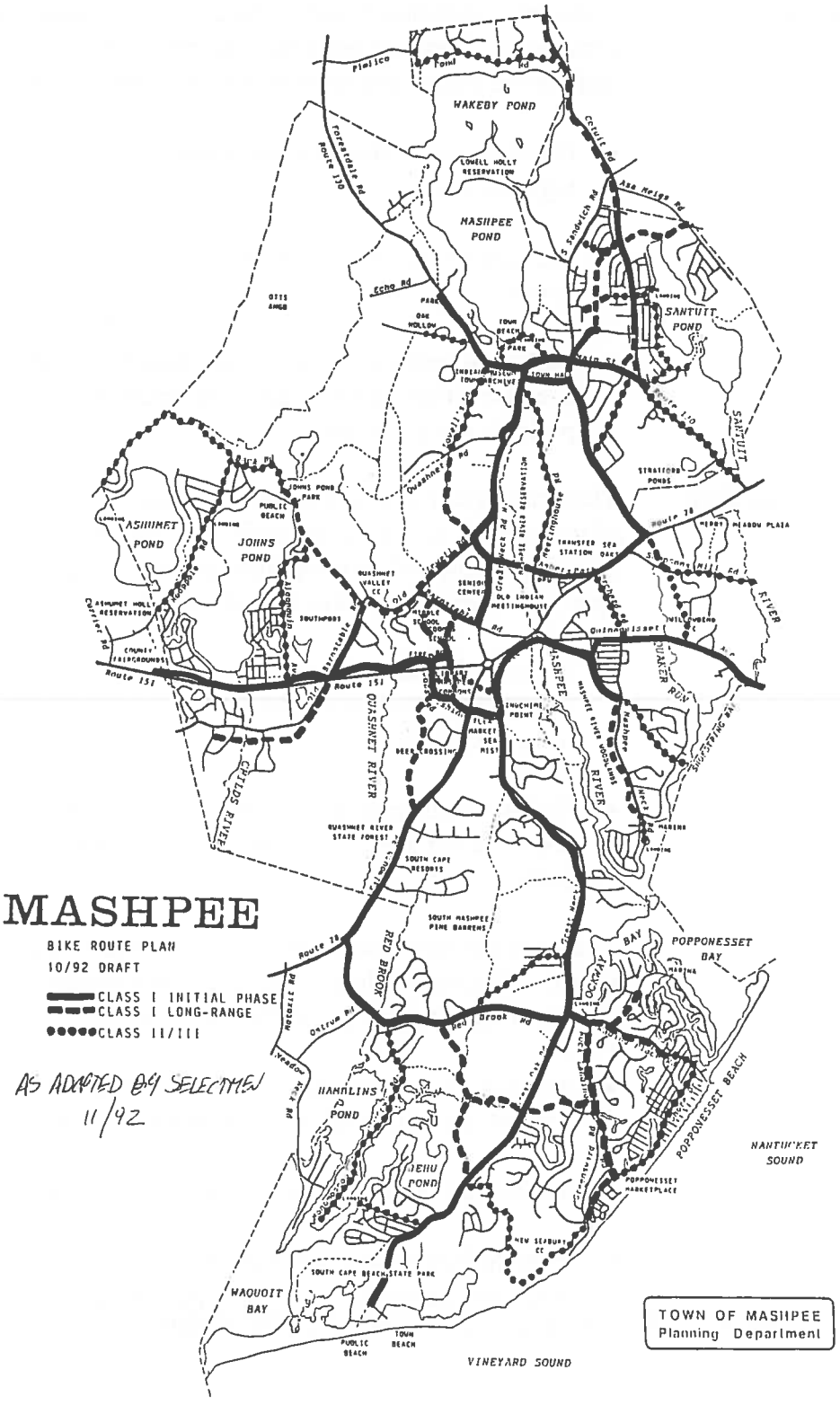

**Table 8-1**
**FHWA Classification of Bicyclists***

| | |
|---|---|
| Group A--Advanced Bicyclists | These are experienced riders who can operate under most traffic conditions. They comprise the majority of the current users of collector and arterial streets and are best served by the following:<br>• Direct access to destinations, usually via the existing street and highway system.<br>• The opportunity to operate at maximum speed with minimum delays.<br>• Sufficient operating space on the roadway or shoulder to reduce the need for either the bicyclist or the motor vehicle operator to change position when passing. |
| Group B--Basic Bicyclists | These are casual or new adult and teenage riders who are less confident of their ability to operate in traffic without special provisions for bicycles. Some will develop greater skills and progress to the advanced level, but there will always be millions of basic bicyclists. They prefer:<br>• Comfortable access to destinations, preferably by a direct route, using either low-speed, low traffic-volume streets or designated bicycle facilities.<br>• Well-defined separation of bicycles and motor vehicles on arterials and collector streets (bicycle lanes or shoulders) or separate bicycle paths. |
| Group C—Children | These are pre-teen riders whose roadway use is initially monitored by parents. Eventually they are accorded independent access to the system. They and their parents prefer the following:<br>• Access to key destinations surrounding residential areas, including schools, recreation facilities, shopping, or other residential areas.<br>• Residential streets with low motor vehicle speed limits and volumes.<br>• Well-defined separation of bicycles and motor vehicles on arterial and collector streets or separate bicycle paths. |

* Excerpted from "Selecting Roadway Design Treatments to Accommodate Bicycles," Federal Highway Administration, January 1994.

While the first class of bicyclists, the "Group A" advanced bicyclists who are comfortable riding with heavy automobile traffic, constitute only about five percent of bicycle users, they are the most vocal and best organized through statewide "Wheelmen" groups and local groups such as "Mad About Cycling", or MAC (which had a number of members on our Subcommittee). As a result, they have been fairly successful in securing the minor shoulder widenings which they feel are adequate to allow their safe use of major roadways. However, their active voice may have, to some extent, drowned out the interests of the other 95 percent of bicyclists who require (more expensive) separate facilities and greater shoulder widenings. More recently, MAC and its members on the Subcommittee have also become supportive of the needs of other bikers and agree that, in some roadway corridors, multiple approaches may be appropriate, with shoulder widenings for advanced on-road bikers and separate bicycle paths for the rest of us. That approach is included in the Subcommittee's recommendations for Mashpee.

In describing the Subcommittee's recommendations, it may be best to begin with definitions of the variety of terms used in speaking about bicycle facilities. To begin with, "***bicycle facilities***" is a general term denoting improvements and provisions made by public agencies to accommodate or encourage bicycling, including parking facilities, bikeway mapping and shared roadways not specifically designated for bicycle use. A "***bikeway***" is any road, path or way which in some manner is specifically designated as being open to bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes. Bikeways are commonly classified in three categories:

A "***bicycle path***" is a bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent right-of-way. It is also known as a "Class I" bike facility.

A "***bicycle lane***" is a portion of a roadway which has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists. It is referred to as a "Class II" bicycle facility.

A "***bicycle route***" is a segment of a system of bikeways (not necessarily involving any separate facility for bicycles) designated by the jurisdiction having authority with appropriate directional and informational markers, with or without a specific bicycle route number.[3] This type of facilityis otherwise designated as "Class III". In this plan the term is used only to refer to a segment of roadway or sidewalk considered safe for bicycling but with no separate bike path or marked shoulder bike lanes.

In addition, bicycles and pedestrians may be allowed to use "***shared sidewalk***" in some locations. The Massachusetts Highway Department (MHD) *Highway Design Manual, 1997 Edition,* recommends that such sidewalks be widened, preferably to 3 meters (10 feet), when substantial numbers of pedestrians and bicyclists are present.

The Master Plan adopted by the Board of Selectmen in 1992 utilized the Class I, II and III designations for proposed facilities. The Subcommittee's recommended plan utilizes the terms noted above with further modifications identifying the recommended widths of some facilities.

Both the Federal Highway Administration (FHWA) and the MHD, as well as the American Association of State Highway and Transportation Officials (AASHTO), have adopted standards for design of bicycle facilities based on extensive research and field experience with existing facilities. The state has essentially adopted the standards recommended by the other two organizations. The MHD's ***Highway Design Manual,***

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[3] Definitions excerpted from "Guide for the Development of Bicycle Facilities," American Association of State Highway and Transportation Officials (AASHTO), August 1991.

**Chapter 12,** as well as their manual for improving community bicycling conditions, entitled ***Building Better Bicycling*** (1994), recognize existing national and federal bicycle facility design guidance provided in three primary documents:

- AASHTO, ***"Guidelines for the Development of Bicycle Facilities,"*** 1991,
- FHWA, ***"Manual on Uniform Traffic Control Devices (MUTCD),"*** 1988, and
- FHWA, ***"Selecting Roadway Design Treatments to Accommodate Bicycles,"*** 1994.

**This plan adopts those design guidelines for construction of Mashpee bike facilities,** with the understanding that limited right-of-way and other constraints may make full conformance with all standards infeasible in some cases.

While not addressing off-road bicycle facilities or specifically dealing with bike lanes along roadways, the Barnstable County Joint Transportation Committee's tables of Desirable Minimum Values for use in Barnstable County recognize the use of roadway shoulders for bicycle accommodation. The shoulder treatments recommended by the JTC for each roadway classification and prevailing speeds are recommended for use to accommodate on-road bicyclists on Mashpee roadways unless otherwise specified in this plan or required by state or federal funding agencies.

Where new bicycle paths have been recommended, the MHD guidelines require that they meet the following general design standards:

- 10 foot minimum width,
- 5 foot minimum separation from edge of roadway,
- 2 foot minimum graded area adjacent to both sides of path (this area should be free of trees, poles, walls, fences, guardrails, or their lateral obstructions).

In certain instances where bicycle and pedestrian volumes are expected to be very low, an 8-foot-wide bicycle path is acceptable

*Keeping in mind that rights-of-way may not always be sufficient to provide desirable road widths, shoulders, and bicycle lanes or that environmental or other factors may prevent construction according to established design guidelines*, Table 8-2 outlines potential roadway treatments to accommodate bicyclists in Mashpee. They have been adapted from the AASTO and FHWA documents referenced previously.

Treatments A through C provide for 4-foot-wide paved shoulders adjacent to 2-lane roadways. Travel lane widths range from 10 to 12 feet with a lower speed limit recommended for the narrowest roadway. The minimum cross section for a 2-lane roadway with shoulders is 28 feet. Treatment A is identical to the JTC desirable minimum value for urban minor arterials where speeds are less than 40 m.p.h. Treatment B is identical to the JTC values for rural minor arterials / urban extensions where speeds are below 40 m.p.h. Treatment C is identical to the JTC values for rural minor arterials / urban extensions where speeds are above 40 m.p.h.

Treatment D provides for 11-foot travel lanes on a 2-lane roadway with a 10-foot-wide bicycle path separated from the road by a 5-foot-wide grass buffer. This minimum cross section for a 2-lane roadway with a separate bicycle path and no shoulders is 37 feet.

Treatments E through G are similar to A through C except a separate bicycle path is provided in addition to the 4-foot shoulders. These cross sections range from 43 to 47 feet depending on the width of travel lanes. These treatments would be used where the Town wants to provide paved shoulders for advanced or moderately experienced cyclists and a separate bicycle path (multi-use trail / shared sidewalk) for less experienced cyclists (children) and for pedestrians.

Treatments H and I provide for a 4-lane undivided road with 12-foot travel lanes and 6-foot shoulders. Treatment I also includes a separate 10-foot-wide bicycle path, which increases the total cross section width from 60 to 75 feet.

These recommendations were developed with input from the general public at a joint Mashpee / Falmouth Alternative Transportation Workshop held on May 24, 1995, and subsequent meetings of the Mashpee Bicycle Planning Subcommittee.

**Table 8-2**
**Alternative Design Treatments to Accommodate Bicyclists**

| Treatment | Travel Lane Width | Number of Lanes | Paved Shoulder Width | Bicycle Path Width | Path-Road Separation Width | Total Width of Cross Section | Maximum Speed Limit |
|---|---|---|---|---|---|---|---|
| A | 10 | 2 | 4 | | | 28 | 35 |
| B | 11 | 2 | 4 | | | 30 | 40 |
| C | 12 | 2 | 4 | | | 32 | 40 |
| D | 11 | 2 | | 10 | 5 | 37 | 40 |
| E | 10 | 2 | 4 | 10 | 5 | 43 | 35 |
| F | 11 | 2 | 4 | 10 | 5 | 45 | 40 |
| G | 12 | 2 | 4 | 10 | 5 | 47 | 40 |
| H | 12 | 4 | 6 | | | 60 | 45 |
| I | 12 | 4 | 6 | 10 | 5 | 75 | 45 |

Specific bicycle facility recommendations are as follows.

**Route 28: Add shoulders at least 4 feet wide along the entire length of Route 28 in Mashpee** to accommodate Group A bicyclists. Add pavement markings and signing to designate the improved shoulders as bicycle lanes to call attention to the rightful presence of bicyclists. The Subcommittee also recommended **establishment of a separate bike path facility along the east / south side of the section of Route 28 between the rotary and the Falmouth town line** to accommodate Group B/C bicyclists. The Subcommittee also suggested **a number of separate bicycle path facilities running roughly parallel to the section of Route 28 between the rotary and the Barnstable town line** for Group B/C bicyclists.

**Route 151:** The Falmouth Bikeways Committee and the Mashpee Bicycle Planning Subcommittee have expressed support for the **addition of shoulders at least 4 feet wide along the entire length of Route 151 in Falmouth and Mashpee** to accommodate Group A bicyclists. They also recommended that pavement markings and signing be added to designate the improved shoulders as bicycle lanes. **An 8-10 foot wide bicycle path in addition to the paved shoulders is also recommended along Route 151 in Mashpee between the Fire Station and James Circle**, a distance of about 10,800 feet. This path would be constructed on the north side of Route 151, using the former location of Bates Road in some areas to provide a safe and attractive riding experience away from high-speed Route 151 traffic. The latter is suggested particularly because the path is intended to be used by children accessing the Town's four existing schools and recreational bicyclists from neighborhoods along the route including, eventualy, the retiree residents of the Southport project.

**Old Barnstable Road:** The 1992 Selectmen's Bike Route Plan recommended construction of a separate bike path along the south side of this road and along a portion of the Commonwealth Edison power line easement as a long-range project. The Bicycle Planning Subcommittee also recommended that **5-8 foot bike path as a long-term project between Route 151 and Lady's Slipper Lane.** The Subcommittee also recommends the addition of **2-4 foot paved shoulders and bike route signage between Route 151 and Great Neck Road North, as well as extension of the separate bike path on the north side of the road west of Great Neck Road to Great Hay Road. Widening of the existing sidewalk north of Route 151 to a 5-8 foot path and extension to Payamps Road** was also supported as a long-range project by the Subcommittee, in conjunction with creation of a **separate 8-10 foot bike path (or 4 foot shoulder lanes as part of a proposed new roadway) along Payamps Road to John's Pond Park.**

**Great Neck Road North: A two-lane upgrade treatment is recommended on Great Neck Road North, including 4-foot shoulders.** In addition, the Bicycle Planning Subcommittee recommended that **the existing 3-foot wide asphalt sidewalk on the west side of the road be widened to accommodate a 5-to-8-foot-wide bicycle path / shared sidewalk,** as did the Selectmen's 1992 plan. If this widening is implemented, the path should not be signed as a bicycle route unless the path is at least 8 feet wide and adequate separation from the roadway is provided. (The existing sidewalk and asphalt curb abut the roadway with no separation.) The Subcommittee also recommended that **the bike path should follow Lowell Road and Great Hay Road to the Coombs School. Alternately, or in addition to that route, Great Neck Road south of Lowell Road, may be worth consideration** if it can be accommodated within topographic and wetland constraints along with the VHB / JTC specified road widening. Alternatively, a bike path route using Lovell's Lane or Quashnet Road, Ashers Path and Lowell Road could also be considered, but is not recommended if the currently vacant land along Ashers Path and Lowell Road south of Quashnet Road is protected as open space and not developed.

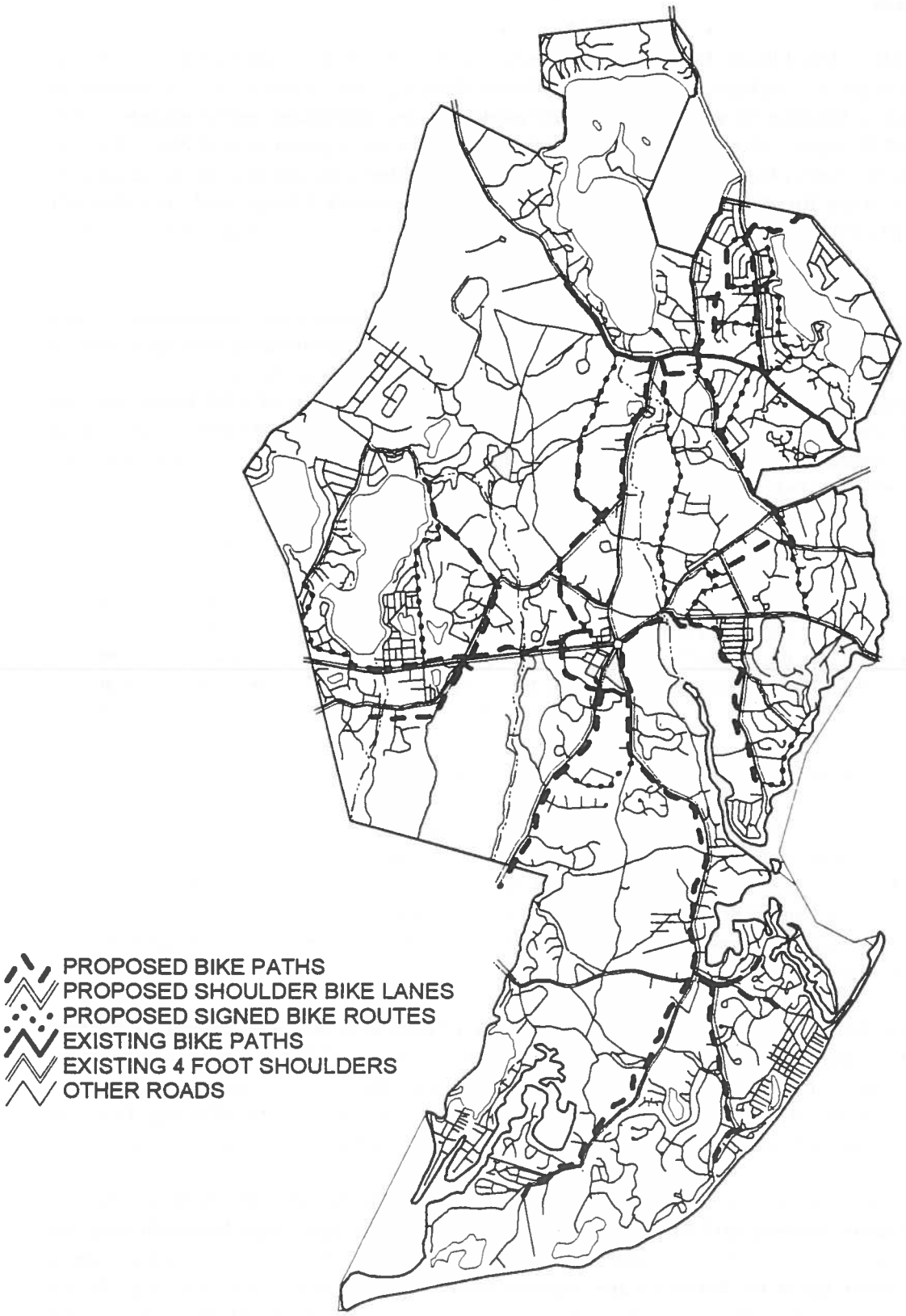
**Great Neck Road South:** In addition to the **4-foot shoulders** recommended to deal with future automobile traffic, the Bicycle Planning Subcommittee has recommended that **a bicycle path be constructed on the west side of the road** primarily to serve Group C bicyclists (children) and Group B recreational riders. This path was the top bikeway priority for 45% of respondents to the Town's 1992 public opinion survey and is identified as an "initial phase" bike path project in the Selectmen's adopted 1992 plan. As noted earlier, it was also proposed for construction both as part of the 1978 Bike Trails Committee project and by the DPW Director in 1988.

**Great Oak Road:** In addition to the wide shoulders which have been constructed along this road, the Bicycle Planning Subcommittee recommended that a **bicycle path be constructed on the west side of the road** primarily to serve Group C bicyclists (children) and Group B recreational users headed to South Cape Beach. This is the same path that was to be constructed by the state as part of their initial agreement regarding the state park. It was also part of the 1978 Bike Trails Committee project and is recommended for "initial phase" construction in the Selectmen's 1992 plan. Much of this path can and should be constructed outside the existing road right of way on federal and Town conservation land. The path has been included in the management plan approved by the Conservation Commission for the Jehu Pond Conservation Area.

**Route 130:** A 2.5-mile 5-8 foot wide "multi-use" path / shared sidewalk from the Barnstable town line to Heritage Park in Mashpee was constructed in 1996-97. VHB's recommended improvements to accommodate bicyclists on Route 130 in addition to the new path were to construct 4-foot shoulders, sign the road as a bicycle route and maintain shoulders free of debris and snow. The recommended roadway improvements for Route 130 west of Heritage Park would provide **4-foot shoulders** as recommended by VHB. East of Heritage Park any shoulder widening would have to be limited to two feet. No road widening is recommended east of Great Neck Road North except for turn lanes that may be required in the future at intersections. Bicyclists east of Heritage Park should be directed to use the new multi-use path / shared

# Recommended Bicycle Facilities

# Map 8-2



sidewalk. Consideration should also be given to eventual **extension of the multi-use path to Echo Road** if it is developed with industries that provide a significant number of jobs **or beyond to the Pickerel Cove Road residential area**.

**Red Brook Road:** Most of Red Brook Road in Mashpee now consists of a 30-foot wide paved cross section with 3-to-5-foot-wide paved shoulders. The Mashpee Bicycle Planning Subcommittee has recommended that Red Brook Road in Mashpee be **posted as a bicycle route without additional improvements**. They also recommend that Mashpee's shoulder treatment be implemented on the segment of Red Brook Road in Falmouth. This improvement **(11-foot travel lanes and 4-foot shoulders) should also be developed on that portion of Red Brook Road in Mashpee between Surf Drive (Seabrook Village) and the Falmouth town line**. More detailed feasibility studies will be required to determine the potential impacts of these improvements.

**Quinaquisset Avenue:** Recommended improvements to accommodate bicyclists on Quinaquisset Avenue include **construction of 4-foot shoulders, signing as a bicycle route and maintaining shoulders free of debris and snow.** The Bicycle Planning Subcommittee and VHB also recommend construction of a **separate bicycle path across the Mashpee River on an abandoned section of Old Route 28 and continuing roughly parallel to Quinaquisset Ave. through the Mashpee River Woodlands and along the former Simons Narrows Road to Mashpee Neck Road.** Further improvements in the Mashpee Neck area are suggested separately below.

**Rotary Area:** Several new roadway extensions or relocations have been proposed in the center of town. These new roadways, together with segments of existing roads, will form a circumferential route around the Mashpee Rotary that could benefit bicyclists as well as motorists in several ways. Viewing the roadways leading to / from the rotary as spokes on a wheel, persons traveling from one spoke to another could use the circumferential route to "cut the corner" and decrease the distance traveled. In addition, the safety of bicyclists could be increased if they traveled on separate bicycle paths along the circumferential rather than traversing the rotary.

VHB's recommended improvements to accommodate bicyclists on circumferential roadways near the center of town were as follows:

- Extend existing bicycle path on Donna's Lane 200 feet to Route 28
- Construct bicycle path along Job's Fishing Road (south / west side)
- When Job's Fishing Road Extension is constructed, include bicycle path as part of cross section
- If Great Neck Road South is relocated, include bicycle path as part of cross section
- Provide a continuous bicycle path along Old Barnstable Road between Job's Fishing Road Extension and Route 28 / Quinaquisset Avenue

The Bicycle Planning Subcommittee supported the **construction of bicycle paths along Donna's Lane and Jobs Fishing Road.** In the case of the latter, an 8-foot-wide bike path was included in the original plans for the road by the developers of Mashpee Commons. When their plans for the area were later changed under a "neotraditional" neighborhood concept, the path was revised by agreement with the Planning Board to become a 14-16 foot wide multi-use sidewalk. Either approach was acceptable to the Subcommittee.

North of Route 151, the Subcommittee's plan calls for locating the **separate bicycle path facility along the former Great Hay Road between Old Barnstable Road and the existing east / west bikepath near the Coombs School**, rather than along the proposed Jobs Fishing Road Extension. Location of **a path along Great Neck Road South north of Donna's Lane**, whether or not it is relocated, is also supported by the Subcommittee, along with any other alternate routing which would **connect the Donna's Lane and**

**proposed Great Neck Road South bike paths with the proposed bike path crossing the Mashpee River noted above**. The Subcommittee did not include a bike path along Old Barnstable Road between Great Neck Road North and Route 28 in its recommendations. In addition, **should Industrial Drive be extended east to Great Neck Road South, it should be signed as a designated bike route.**

VHB made no specific recommendations for a number of other principal roadways in the town. However, the following recommendations have been made by the Bicycle Planning Subcommittee:

**James Circle / Hooppole Road / Back Road:** The addition of **2-4 foot paved shoulders is recommended along Hooppole Road between Owl Lane and Back Road and along Back Road between Hooppole Road and John's Pond Park.** In addition, an **8 foot wide bike path connection is recommended between the end of Owl Lane and Hooppole Road** (requiring acquisition of a right-of-way) along with **signing of Owl Lane and James Circle to Route 151 as a Bike Route** connecting with the proposed Route 151 bike path.

**Payamps Road / Algonquin Avenue:** Construction of **Payamps Road between Old Barnstable Road and Back Road** has been suggested to provide alternative access, particularly for police and fire emergencies, to the Briarwood area. If that roadway is built, the Subcommittee recommends that it **include four foot wide paved shoulders and be signed as a bike route. If the roadway is not built, a separate 8-10 foot wide bike path is suggested**. In either case, it is recommended that **Algonquin Avenue be signed as a bike route, possibly with the addition of two foot paved shoulders, and be connected to the new roadway or bike path.**

**Lowell Road:** The **addition of 2-4 foot wide paved shoulders or, alternately, 12-14 foot shared travel lanes,** is recommended. In addition, as noted above, the Subcommittee recommends that **a separate bike path be constructed along Lowell Road between Great Neck Road and Great Hay Road, continuing on Great Hay to the Coombs School**, as the preferred alternative to constructing such a bike path along Great Neck Road North.

**Lovell's Lane / Quashnet Road:** These roadways should be **increased in width to 24 feet** in conformance with the JTC minimum values for secondary / local roadways to safely accommodate both motor vehicles and bicycles. As noted earlier, Lovell's Lane might also be considered as an alternative routing for bicycles vs. Great Neck Road North in conjunction with construction of an 8-10 foot bike path on the currently unpaved portion of Lovells Lane and Ashers Path between Quashnet Road and Lowell Road.

**South Sandwich Road area:** The Subcommittee recommended the **addition of 2-4 foot paved shoulders** along this road. A paved **4-5 foot sidewalk should also be built on its east side**, with a proper non-mountable curb or five foot separation between the sidewalk and roadway. In addition, **an 8-10 foot wide bike path is recommended on a separate location through the Town's Besse Bog Conservation Area from the intersection of Route 130 and South Sandwich Road to connections with Windsor Way, Sandy Fox Drive and Scituate Road** (right-of-way acquisition required for the latter). Should the Town decide to construct a school on the current site of the Wampanoag Rod & Gun Club (see School Facilities element) or acquire the property for conservation purposes, **this bike path could be extended to Leamington Lane**. Should this bike path be constructed, the connecting roads mentioned should be signed as bike routes.

**Sandwich-Cotuit Road area:** The Subcommittee recommended that **four foot paved shoulders** be constructed along both Mashpee segments of this roadway and be signed and marked as bike lanes. Subcommittee also suggested that the Town of Sandwich be requested to develop the same roadway treatment along their portion of the road. As an interim or additional measure, **Holly Way, Timberlane**

**Drive, Nobska Road and Shields Road should also be signed as a bike route, along with a Hornbeam Lane connection to Cotuit Road at Scituate Road.** Depending on where the Town decides to locate its future new school facilities, **a separate bike path should also be considered as a long-range project along the portion of this road between Route 130 and Leamington Lane** and any construction projects along that roadway should reserve room for such a path. In addition, the Subcommittee recommended construction of a **bike path to connect Cotuit Road at Leamington Lane to Santuit Pond Road and the Santuit Pond Estates subdivision** through a wooded area north of Santuit Pond which is primarily owned by the Town.

**Noisy Hole Road:** If this roadway is fully constructed as a Town road between Route 28 and Route 130, the Subcommittee recommended the provision of **four foot paved shoulders**. Should the Town construct a new school or schools between Town Hall and Goodspeed's Meetinghouse Road (see School Facilities element), a **separate 8-10 foot bike path should be considered as an alternative, along with two foot paved shoulders or 12 foot shared travel lanes**. Sunset Strip could be signed as a bike route if the suggested Noisy Hole Road improvements are carried out.

**Meetinghouse Road:** The Subcommittee recommended that this roadway be **signed as a bike route, with possible shoulder widening to 2-4 feet** at some future date if traffic increases reduce bicyclist safety. Should a new school be built behind Town Hall, a bike path connection to the school and the Route 130 path should be built to divert bike traffic from the dangerous Great Neck Road North / Meetinghouse Road intersection. If the recommended relocation of Quinaquisset Ave to a signalized intersection with Route 28 and Meetinghouse Road is constructed, this route could be connected to the proposed bike path crossing of the Mashpee River to provide an attractive north / south bike route alternative to Great Neck Road North.

**Sampson's Mill Road / East Mashpee:** The Subcommittee recommended that **two foot paved shoulders** be added to this roadway to accommodate Group A bikers passing through from Cotuit, although it would still be inadequate to serve as a signed bike route. **Alternately, it could be upgraded to** meet the JTC minimum recommendation of **12 foot shared travel lanes** on secondary / local roads. In addition, **should the intersection of Sampson's Mill Road with Route 28 be relocated** to a signalized location opposite Noisy Hole Road, the new section of roadway should have **either 4 foot paved shoulders or a separate bike path facility**, depending on the choice selected for Noisy Hole Road. This would allow safe bike access from the Sampson's Mill Road area to the proposed new school and other points in north Mashpee, and would provide safe access for residents of that part of town to the proposed recreation area on the west side of the current Sampson's Mill Road at Route 28.

In addition, the Subcommittee recommended that a **separate bicycle path facility be constructed between Sampson's Mill Road and Harwich Road, either along the Commonwealth Electric power line easement or along the south side of Route 28** (on new expanded right-of-way). **Harwich Road and Brewster Road would become signed bike routes to provide a further connection to the proposed new Mashpee River crossing and Mashpee Commons**. Finally, Simons Road, which extends from Sampson's Mill Road to Quinaquisset Ave. through the Willowbend development (and has been renamed Willowbend Drive by the developer near Quinaquisset Ave.) could be signed as a bike route if it is ever paved for that entire length.

**Mashpee Neck area:** In addition to the previously-mentioned bike path across the Mashpee River and along old Simons Narrows Road west of Mashpee Neck Road, the Subcommittee made a number of other recommendations for the Mashpee Neck area. **Widening of the paved shoulders on Orchard Road by two feet** was recommended, along with **four foot paved shoulders on Mashpee Neck Road north of Simons Narrows Road and two foot paved shoulders south of that road, as well as the addition of 2-4 foot wide paved shoulders on Simons Narrows Road east of Mashpee Neck Road.** In addition, it was

## Table 8-5

### Mashpee Bicycle Planning Subcommittee

### Prioritization of Bicycle Facilities

| Priority # | Route | From: | To: | Type of Facility | Est. Distance |
|---|---|---|---|---|---|
| 1 | Route 28 | Mashpee Commons | Quinaquisset | 4'-6' Shoulders | 0.45 |
| 2 | Route 28 | The remaining portion | | 4'-6' Shoulders | 3.50 |
| 3 | Great Neck Road N | Town Hall | Mashpee Commons | 2' Shoulders | 2.20 |
| 4 | Route 151 | Mashpee Commons | James Circle | Separate Bike Path - to follow Bates Rd. | 1.75 |
| 5 | Great Neck Road S | Donna's Lane | New Seabury Entrance | Separate Bike Path | 2.35 |
| 6 | Jobs Fishing Road | Route 151 | Great Neck Road S | Sidewalk | 0.70 |
| 7 | Route 151 | Jobs Fishing | Rotary | 4'-6' Shoulders | 0.40 |
| 8 | Rte. 130/ Lowell Rd | Town Hall | Middle School | 8'-10' Bike Path | 2.10 |
| 9 | 130 to Scituate | S. Sandwich & 130 | Cotuit Road | Separate Bike Path | 0.50 |
| 10 | Quinaquisset Road | Route 28 | Town Line | 2'-4' Shoulders | 1.70 |
| 11 | Old Barnstable Rd | South of Rt. 151 | Town Line | 2' Shoulders | 1.25 |
| 12 | S. Sandwich Road | Route 130 | Town Line | 2'-4' Shoulders | 1.20 |
| 13 | Old Barnstable Rd | Great Neck Road N | Route 151 | 2'-4' Shoulders | 1.65 |
| 14 | Wading Place Rd | Entrance N. Seabury | Shore Drive | Upgrade existing path 5'-8' wide | 0.75 |
| 15 | Owl Lane/Hooppole | Owl Lane connection | to Hooppole | 8' Path | 0.05 |
| 16 | Hooppole | Town Line | Back Road | 2'-4' Shoulders | 1.25 |
| 17 | Mashpee Neck Rd | Quinaquisset | Simons Narrow | 2'-4' Shoulders | 0.45 |
| 18 | Cotuit Road | Route 130 | Town Line | 2'-4' Shoulders | 1.30 |
| 19 | Route 28 | Jobs Fishing Road | Town Line (Falmouth) | 8'-10' Bike Path | 1.50 |
| 20 | Rock Landing | Wading Place | Shore Drive West | Upgrade & pave existing path 5'-8' wide | 1.45 |
| 21 | Woodlands bike path | Commons | Mashpee Neck Road | 8'-10' Bike Path | 0.95 |
| 22 | Simons Narrow | Mashpee Neck Road | Quaker Run | 2'-4' Shoulders | 0.60 |
| 23 | Mashpee Neck Rd | Simons Narrow | Pirates Cove | 2' Shoulders | 0.95 |
| 24 | Noisy Hole Road | Route 28 | S. Sandwich & Rt. 130 | 2'-4' Shoulders | 1.35 |
| 25 | Brewster/Harwich lnk | Connection to | Rt. 28 and Orchard Rd. | Separate 8'-10' path w/ signals @ int. | 0.15 |

| Priority # | Route | From: | To: | Type of Facility | Est. Distance |
|---|---|---|---|---|---|
| 26 | Powerlines Route | Harwich Road | Sampsons Mill | 8'-10' Bike Path | 0.65 |
| 27 | Sampsons Mill | Simons Road | Town Line | 2' Shoulders | 0.60 |
| 28 | New Bike Path | Noisy Hole | Sampsons Mill | 8'-10' Bike Path | 0.30 |
| 29 | Santuit Pnd Estates | Cotuit Road | Santuit Pond Road | 8'-10' Bike Path | 0.45 |
| 30 | Daniel Island Road | Wading Place Road | Popponesset Island Rd. | 8'-10' Bike Path | 0.30 |
| 31 | Great Neck Road S | Jobs Fishing Road | New Seabury Entrance | 2'-4' Shoulders | 2.35 |
| 32 | Orchard Road | Route 28 | Quinaquisset | 2' Shoulders | 0.45 |
| 33 | Route 130 | Barnstable Town Line | Sandwich Town Line | 2'-4' Shoulders | 4.15 |
| 34 | Old Barnstable Road | South of Route 151 | Winslow Farms Ent. | 8'-10' Bike Path | 0.90 |
| 35 | Payamps Road | Old Barnstable Road | Back Road | 8'-10' Bike Path | 1.05 |

recommended that Frog Pond Close, Lighthouse Lane and Quaker Run Road be signed as bicycle routes. As a long-term option, a separate recreational bike path through the Mashpee River Woodlands parallel to Mashpee Neck Road is a recommendation of the management plan adopted for that conservation area by the Conservation Commission in 1986.

**New Seabury:** While the roadways and paths in New Seabury are privately owned, the Subcommittee also suggested that the residents of the area consider a number of new facilties and facility upgrades to provide safe connections to the remainder of the proposed bike facility network. **At the New Seabury entrance between Great Neck Road South and Rock Landing Road, then extending to Daniels Island Road, a new 8-10 foot bike path is recommended**. The currently **closed section of Daniel's Island Road**, which extends to By-the-Green Way could be **rehabilitated as a bike path**. The existing partially paved 2-4 foot wide **paths along the west sides of Rock Landing Road and Wading Place Road could be paved and widened to 5-8 feet** to accommodate bicycles. A new **8-10 foot bike path could be constructed along Shore Drive West between Popponesset Marketplace and Triton Sound Circle or a connection could be made between the western end of Shore Drive (at Rock Landing) and the Maushop Village street system to provide a signed bike route. Four-foot paved shoulders should be added to Red Brook Road / Wading Place Road between the wide New Seabury entrance area and the beginning of the median island in Wading place Road. In addition, two-foot paved shoulders should be considered on both sides of Rock Landing Road along its entire length.**

**For general planning purposes, this plan adopts VHB's recommendations as modified and expanded by the Bicycle Planning Subcommittee** as described above and summarized by the Subcommittee's recommended schedule of project priorities as shown on Table 8-5. It is recognized that actual project scheduling will depend on the availability of funding and the results of more detailed project feasibility studies.

**Townwide Bicycle Facility Recommendations:** In addition to specific facility recommendations, VHB suggested, and this plan adopts, the following general recommendations regarding bicycle facilities:

- Conduct engineering feasibility studies of recommended roadway/bikeway facilities to determine impacts to environmental resources and private property and to develop refined cost estimates
- Develop detailed designs of transitions between different types of bicycle facilities and road crossings.
- Develop projects to add bicycle parking facilities to existing public and private facilities including town buildings, schools, parks, beaches, and commercial and industrial developments.
- Include bicycle parking facilities in all new public and private development projects as appropriate.

Appendices are also included which contain more detailed or background information on a number of issues discussed in the Plan. As transportation is a fairly complicated subject and one which is critical to the well-being of our community, it is hoped that this intentionally thorough plan and appendices, along with the consultant report and other documents referenced in the plan, can provide a convenient and solid foundation on which to base future decision making and implementation activities of the Town and other agencies.

## Pedestrian Facilities

Mashpee's limited Town-owned pedestrian facilities were inventoried previously. In addition to the three sidewalks listed, both existing and proposed bicycle and multi-use paths serve pedestrians as well. There is also an extensive existing and proposed network of walking trails identified as part of the Open Space, Recreation and Agriculture element of this plan.

Pedestrian trips are typically quite a bit shorter than bicycle or auto trips, so that facility networks will logically be more compact. At this point, two such networks appear to be appropriate as part of future development plans. The first is an **expansion of the current private sidewalks at Mashpee Commons to adjacent properties**. The high-density development pattern proposed for the area lends itself to walking as an alternative to cars and bicycles. **New links should be established with the Deer Crossing, Talanian (flea market), Windchime Point, Sea Mist, Sandalwood, Sandpiper and Quashnet Valley neighborhoods and Mashpee Commons' future proposed neighborhoods**. The high school, TCB Mashpee Village, Southport and other more distant locations will be linked to this central area by the previously-described bicycle path network.

The second, smaller network would focus on the Town Hall / Attaquin Park area and the proposed new elementary school(s) east of Town Hall. The existing Great Neck Road North sidewalk and Route 130 multi-use path would be supplemented by the previously-described bike paths as well as sidewalks along South Sandwich, Noisy Hole, Quashnet and Ashumet Roads and Lake Avenue and existing and proposed walking trails. Other pedestrian facilities or improvements should be developed where appropriate, including upgrades to the New Seabury walking path network, access routes to schools to facilitate walking and reduction of busing costs, and near Town recreation areas.

All pedestrian facilities should be designed and built to meet the requirements of the Americans with Disabilities Act (ADA), which requires that new or reconstructed sidewalks have a minimum unobstructed width of four feet. In addition, cub cuts should be provided at all roadway and (where necessary) driveway intersections. Sidewalks should also be separated from adjacent roadways by vertical curbs and, preferably, at least five feet of space.

## Transit

**Potential New Services:** The only fixed route transit service currently provided year-round in Mashpee is the Sea Line route, which is operated by the Cape Cod Regional Transit Authority (CCRTA). This route connects the Steamship Authority terminal in Woods Hole with Hyannis and Barnstable Village linking Mashpee, Falmouth and Hyannis. Service between the three communities is provided along Route 28. Annual operating costs are currently about $155,000. Passenger revenue accounts for about 21 percent of operating costs. The remainder of operating costs are covered predominantly by federal, state, and municipal subsidies. The Sea Line carries about 30,000 passengrers annually, which averages about 100 passengers daily, Monday through Saturday. Ridership averages less than five passengers per hour of service.

The infrequency of service and excessive travel times make the bus service extremely noncompetitive compared to the private automobile and, in part, explain the low ridership. The headway (time between buses) is about 2 to 3 hours. Due in part to diversions off Route 28 in Mashpee and Centerville (at the time the VHB report was done), it takes about 50 minutes to travel from Mashpee Commons to downtown Hyannis.

VHB held meetings with representatives of the CCRTA, Falmouth, and Mashpee to discuss potential improvements to transit and paratransit services. A joint Mashpee / Falmouth Alternative Transportation Workshop was also held on May 24, 1995, to gain public input on transit and paratransit services. Some of the public comments were:

- The Sea Line vehicle (van-on-chassis type) does not look like a bus, and people mistake it for the b-bus (paratransit vehicle).
- The Sea Line does not run late enough.
- Connections to the ferry in Hyannis are poor.

- Marketing of the service is poor.
- The bus does not run frequently enough

Following an analysis of transit and paratransit services, VHB developed recommendations for 2004. Improvements beyond this time frame were not discussed at the Alternative Transportation workshop and are much more difficult to predict at this point. Consequently, detailed proposals are limited to 2004, with more general concepts proposed as appropriate beyond that horizon.

Ten-year recommendations for fixed route transit services are centered around enhancements to the Sea Line route and schedule, increasing frequency of service from one bus every two to three hours (120 to 180 minute headway) to hourly bus service (60 minute headway). The eight new round trips proposed by VHB are all proposed to follow Route 28 in its entirety. The number of bus trips provided daily would increased from 6 to 14, and service hours would be extended later into the evening. The total vehicle requirement on the enhanced Sea Line service as recommended by VHB would be five buses (four peak vehicles and one spare).

In addition to Sea Line service on Route 28, several other roadways linking Mashpee and Falmouth could potentially serve as transit routes: Route 151 and Old Barnstable Road. Route 151 does not connect to downtown Falmouth or other significant trip attractors. Old Barnstable Road has no major trip attractors and low population densities. For these reasons, it was the consensus of Mashpee, Falmouth, CCRTA, and VHB representatives at a meeting on August 16, 1995, that neither roadway warrants transit service in the foreseeable future.

In addition to the enhancements to the Sea Line service recommended above, other transit service improvements within Mashpee are recommended for both 10-year and Buildout conditions:

**Develop a transit center** at Mashpee Commons or some other location in the vicinity of the Rotary. The center should provide at least three to four bus bays, a covered passenger waiting area (shelter) and information kiosks.

**Develop bus stops, turnouts, and shelters along bus routes in the vicinity of major trip attractors** (commercial, industrial, and recreational developments) **and major trip generators** (residential developments). Seek private participation in the development of these transit facilities.

**Refine "Mashpee Trolley" feeder bus service** to increase ridership, which has been disappointingly low. VHB recommends use of the Trolley as a feeder bus service providing hourly bus service linking the Mashpee Transit Center with the folowing areas:

- Santuit Pond area via Great Neck Road North, Route 130, South Sandwich Road, and Cotuit Road
- John's Pond area via Route 151 and Algonquin Avenue
- Great Neck Road South and Great Oak Road with service to South Cape Beach in the summer

Estimated annual operating cost of this service would be $250,000. Estimated initial capital costs for 4 small buses (3 peak, 1 spare) would be $300,000.

Provide a **park-and ride facility** at Mashpee Commons or at an alternative location in the vicinity of the Mashpee Rotary. Other locations along Route 28 should be investigated to encourage residents to use the Sea Line bus after service is enhanced. Residents who attended the Mashpee Neck neighborhood workshop supported a **park-and-ride lot** on land owned by Commonwealth Electric **on the southwest corner of Route 28 and Orchard Road.**

As growth continues, the town and its neighbors should explore the potential for other services, examples of which include the possibility of either a **public feeder bus** or **employer shuttle van connection between downtown centers** (e.g., Mashpee Commons) **and remote parking facilities** along the Cape's regional highway system (e.g., Exit 2 of Route 6 in Sandwich). Such facilities should be considered in continuing discussions with the CCRTA and affected communities. Further studies on implementation feasibility and operating details will have to be undertaken as conditions become known in future years.

The extension of **MBTA rail service to Plymouth** also suggests additional transit possibilities, including **bus service from the rail station to the Sagamore rotary, Sandwich, Forestdale / South Sandwich, Mashpee Town Hall and Mashpee Commons,** possibly continuing via Route 28 to Falmouth and Woods Hole, or to Cotuit and Hyannis. Potential for such service should be discussed with the MBTA, CCRTA and private bus lines such as P&B, Bonanza, Pina and other local operators.

The **b-bus**, being an on-call service, does not appear to require any adjustments in the immediate future. In the longer term, if the suggested Sea Line service upgrades discussed above are implemented, it may be that demand for the b-bus actually declines somewhat. Service adjustments should continue to be made based on actual demand.

## Trip Reduction & Mode Shift Strategies

A variety of methods are available to reduce or manage traffic demand during peak hours, including the following:

- increased use of transit
- carpooling and vanpooling (ridesharing)
- alternative work schedules (e.g. compressed work week and flextime)
- employee parking supply reduction
- employee parking charges
- increased use of other alternative travel modes (e.g., bicycling and walking)
- mixed-use development
- zoning controls
- shared parking arrangements
- remote employee parking with shuttle operation
- education program
- Intelligent Transportation System (ITS) measures (e.g., variable message signing and highway advisory radio)
- improved freight management (e.g., regional rail in lieu of highway, time restrictions)
- congestion "pricing" (i.e., accept peak-season congestion to "meter" traffic growth)

Several of these (e.g., transit, pooling, biking, walking) are self-explanatory in that increased use of other travel modes will reduce the overall number of vehicle trips.

**Alternative work schedules**, if implemented comprehensively and correctly, will tend to disperse vehicle trips away from normal commuting hours, thereby freeing up peak-period road capacity. Parking supply and cost have been shown to be important factors in the decision to drive, particularly for the commute trip. If supply is reduced or if a high enough cost is imposed, other modes become more attractive. Providing remote employee parking, along with a shuttle bus or van connection to the workplace, can also be an effective mechanism to reduce commuter driving in the right situations.

**Mixed-use development** (residential, office, retail) tends to limit tripmaking in that the need to drive is reduced or eliminated as one's home, workplace, and shopping opportunities are in close proximity.

Although having all three uses together is most effective, even implementing only office and retail will reduce some trips, especially off-peak, if the right mix of uses is provided. Shared parking spaces among various land parcels and uses will tend to reduce the need to circulate by vehicle from one area to another, assuming they are within reasonable walking distance of each other. Our zoning power is one of the most effective measures available to control growth itself and the form it takes and should be considered in any comprehensive program designed to reduce tripmaking.

Various **road management** options can also reduce trips on key elements of the system during peak periods or during emergency situations. These include **variable message signs** and **advisory radio** to direct traffic to desired routes.

Since there is a significant amount of truck traffic on the road system, it would be desirable to find ways to reduce some of this traffic for capacity and safety reasons. **Diverting regional truck tonnage to other modes** (e.g., rail, where available in nearby communities) would be beneficial in this regard in that fewer trucks would travel the Cape's arterial system, including those in Mashpee. Alternatively, working with commercial interests to **restrict certain truck movements to non-peak periods** would also help.

Although not normally thought of as a trip-reduction measure, **accepting a certain amount of congestion** during peak travel times (the "price" of congestion) tends to limit travel in and of itself. For example, acknowledging that it would be cost-prohibitive or environmentally unsound to provide sufficient capacity to handle peak summer traffic, a condition that persists for two or three months of the year, would keep some trips from being made during these periods by people who do not tolerate congestion well. Also, congestion tends to spread out the peak travel times for the same reason.

Finally, an **information program** for residents, commuters, tourists, shoppers, and the general public would help educate trip makers about various programs and services in place (or being contemplated) to serve their travel needs without necessarily involving the automobile, or at least without requiring that car trips be made during the worst of the peak travel periods.

Each of these approaches can be effective in the right circumstances, although it is usually difficult for one or more to be so successful that it precludes the need for additional road capacity, particularly in areas of low-to-moderate density such as Mashpee. A critical mass is normally required to sustain effective non-automobile modes and is much more characteristic of larger urban concentrations. This typically results in such programs being beneficial as complementary to capacity-based solutions rather than as replacements for them. Nevertheless, they are worth exploring as part of a comprehensive approach to future growth needs.

For maximum effectiveness, however, many of these potential measures require implementation beyond Mashpee's borders. They should be part of an overall **regional strategy** designed to manage all modes of transportation and promote an integrated system that deals with all trip-generating components. Much of Mashpee's traffic problem is the result of what happens in other communities, whether in terms of commuters going to jobs generated elsewhere, shoppers coming into town from surrounding residential neighborhoods, recreational traffic passing through Mashpee on the way to other Cape Cod attractions, etc. Regional problems require regional solutions, the beginnings of which are documented in the Cape Cod Commission's long-range transportation plan called "A 2020 Vision". Mashpee can be part of the solution but cannot by itself create the conditions that rectify all of its traffic and transportation problems. The town's most powerful tool involves control of land within its borders and that can be a significant force in managing growth and the resulting traffic demands. However, unless similar controls are in place elsewhere, externally generated traffic will continue to create pressures within Mashpee that are difficult to manage effectively.

Recognizing the regional nature of transportation problems and solutions, the town should work with the Cape Cod Commission, surrounding towns, local employers, and others affecting or affected by transportation facilities and services to **develop a Transportation Management Association (TMA) involving Mashpee, Falmouth, Sandwich, Bourne, and Barnstable.** The TMA would include representatives from each member and become involved in all important transportation matters in the five-town region. It would serve as an advocate for improved transportation facilities and services for the inner Cape area, including some of the more regionally oriented proposals made in this study.

In addition, it is proposed that as many of the potential trip-reduction measures identified above be implemented as possible, particularly since it has already been proposed to limit road widenings to a maximum of four travel lanes, and further capacity reductionswere made for some roadways which warranted expansion to four lanes. In some instances (generally on the main arterial system), the recommended widenings will not be sufficient to accommodate traffic volumes likely to be generated by projected full buildout land uses. The following specific actions should be considered in developing a non-roadway response to transportation problems in Mashpee:

- Give serious consideration to various **zoning and land use options** in that they constitute an internal opportunity for growth control without the need for outside intervention or cooperation. **Encourage mixed-use development, larger green space requirements, and lower trip-generating uses.**
- Given the close relationship between parking supply and travel mode choice, **consider establishing maximum, rather than minimum, parking space requirements** for various land uses as part of the zoning regulations. The town should coordinate with area developers in setting appropriate limits.
- Undertake a Mashpee **origin-destination study** to develop a better understanding of travel patterns within and through the town. It should include data for typical summer peak weekday and weekend conditions, as well as for off-peak "shoulder" seasons. Such information is necessary to establish basic parameters required for certain travel management actions, both townwide and regional. The data could also serve as input to a townwide (or possibly a joint Mashpee-Falmouth or upper-Cape) travel demand model, which would be desirable for future transportation planning activities and to validate some of the travel assumptions made as part of the VHB study.
- It is proposed that the town coordinate with area employers to **develop a trip-reduction program** involving the following measures, which are based on a report outlining transportation demand management strategies in the Barnstable/Yarmouth area that could serve as a model for a local initiative in Mashpee.[4] The Town should implement the program as appropriate for proposed developments and attempt to extend reduction measures to existing employers as well.
  - ⇒ ridesharing (carpooling and vanpooling),
  - ⇒ preferential parking for poolers,
  - ⇒ alternative work schedules (flexible hours, 4-day work week, telecommuting, etc.)
  - ⇒ parking charges and/or subsidies to those using alternative modes,
  - ⇒ guaranteed ride home program,
  - ⇒ provision of bicycle racks or lockers, as well as shower facilities,
  - ⇒ employee education and incentive programs,
  - ⇒ periodic monitoring and reporting to determine compliance with objectives,
  - ⇒ appointment of transportation coordinators.
- Consider establishing an **impact fee ordinance** and procedure modeled after the CCC's regulations. The focus would be on **providing incentives to encourage low-to-moderate intensity development, employer-based travel demand management measures and an equitable transportation mitigation funding source** to alleviate the impacts of future development.

[4] "Short Range TDM/TSM Plan," McDonough & Scully, Inc., June 1995

- Consider participating in joint agreements with neighboring towns (Falmouth, Sandwich, Bourne, Barnstable), the CCC and the CCRTA to **locate and implement remote parking facilities at regional highway interchanges** (e.g., Route 6, Route 28) to intercept motorists destined for inner Cape employment sites, shopping facilities, or other attractions (e.g., Mashpee Commons, South Cape Beach). Such facilities would have to be coordinated with CCRTA transit route extensions and bicycle routes. As an example, parking could be provided at Exit 2 of Route 6, with a transit route running along Route 130 or Cotuit Road into Mashpee, or possibly a joint employer shuttle bus or van.
- Implement **variable message signs and/or advisory radio** to advise motorists about traffic incidents and potential route diversions.
- Coordinate with the Cape Cod Regional Transit Authority to **implement the transit recommendations** identified previously.
- Similarly, **implement the bicycle and pedestrian recommendations** that have been proposed.
- Work with the Cape Cod Commission and the proposed Transportation Management Association on the development of a **regional freight management program** regarding possible shifts from truck to rail in communities where possible (this will require a separate regional study to identify potential locations).
- Initiate discussions with local employers regarding **voluntary time restrictions on truck movements** (away from peak commuter and tourist traffic periods).
- Develop a **promotional program** for town residents, employers, employees, tourists, truckers, and others using town roads. The program should focus on ways **to encourage alternative-mode travel behavior and discourage single-occupant auto use** to the extent possible. Although it would be desirable for the Town to retain a public relations or advertising consultant to identify and carry out such a program to achieve maximum effectiveness, a number of ideas on how to accomplish this were developed by VHB and are presented below.

## Promotion of Non-Auto Travel Alternatives

Although many alternatives are available to single-occupant automobile travel, as discussed previously, maximum levels of trip-making reductions are not likely to be achieved without a program of organizational and promotional efforts. Most are applicable locally, to joint efforts with adjacent towns such as Falmouth, or even more regionally with other neighboring communities. These efforts were assembled by VHB into the nine categories outlined and discussed below under the key words: "organize", "utilize", "advertise", "subsidize", "analyze", "authorize", "computerize", "standardize" and "recognize".

**Organize:** Do not try to "go it alone." To be successful, Mashpee must join forces with as many groups as possible. These include other towns, the CCC, area employers, the MHD, the CCRTA, bicycle organizations and others. The town must be an advocate for change and a catalyst to help get things moving. This could be the way to form a **Transportation Management Association** (TMA) for the upper Cape area as proposed earlier (Mashpee, Falmouth, Barnstable, Bourne, and Sandwich) and alternative transportation modes could be its first agenda item.

To get the process started, as well as to maintain its momentum once initiated, it is proposed that Mashpee **appoint a Transportation Coordination Committee** to oversee all transportation-related activities in the town and to act as a contact with outside groups and agencies. The Committee should include the Public Works Director, Town Planner, Police Chief and two representatives of the community appointed by the Board of Selectmen and should report to the Selectmen.

**Utilize:** Numerous informational resources are available from various organizations and agencies that have undertaken similar efforts in other areas. Mashpee should utilize the resources of the CCC and other regional planning organizations, the MHD and other state agencies, the CCRTA and other transit groups and various bicycle and pedestrian-oriented organizations (e.g., Mad About Cycling, Walk Boston, etc.). Some research will have to be conducted to develop a network of information sources, not only locally but also throughout the state, New England and other areas as well, both nationally and internationally (see "Computerize" below). Persistence in finding the right information will pay dividends in addressing organizational, administrative, technical, funding, promotional and other issues.

**Advertise:** Many avenues are available to get the message out and mold people's opinions. Newsletters, flyers, press releases, radio announcements and the like can all be used effectively to promote the need for alternative transportation modes, to implement the necessary infrastructure and facilities and to achieve effective utilization of those facilities. This will require a broad-based approach to cover all potential user groups, including residents, employees, shoppers, tourists and other recreational users. An informational brochure on alternative facilities and services available (or potentially developable), routes, schedules, costs, benefits of using alternative modes, etc., should be developed and disseminated through mailings or distribution at stores and businesses. Permanent information booths or kiosks should be established and appropriately located (e.g., at Mashpee Commons) where residents, visitors, and others can obtain travel-related information. An annual or semi-annual "Transportation Day" could be organized to promote the use of alternative modes, organize ridesharing groups, distribute printed information, and generally make it known that there are adverse consequences for all concerned if reliance on the automobile is not reduced. Every opportunity should be explored for free advertising via press coverage of meetings, activities, events and news releases.

**Subsidize:** An incentive program may be necessary to encourage as many people to participate as possible in alternative mode programs. This can take various forms. For example, actual subsidies may be worked out whereby part of an employee's transit cost is reimbursed by the employer. Discount vouchers may be provided by the town, TMA, employers, merchants or others for rental of bicycles by tourists, other visitors or residents. Prizes donated by the same groups may be awarded to winners of contests involving the best promotional ideas on alternative modes. People often respond to free or low-cost services, so tests or demonstrations of proposed alternative-mode strategies (similar to previous bus shuttle service in Mashpee) should be instituted which, if possible, are provided at no cost or for a nominal charge. Funds can be sought from merchants, employers and others to cover a portion of the operating and maintenance costs.

**Analyze:** As various efforts are underway, information should be collected on their status and effectiveness, particularly on why they are successful or, just as importantly, why they are not. Periodic surveys (via questionnaire, telephone, interview, etc.) should be undertaken to identify attitudes and opinions on local and regional transportation programs and, in particular, on new services or facilities. Surveys of shoppers, employees, residents, and others will provide valuable information that can focus what may be limited budget and manpower resources toward those things that work best.

**Authorize:** There is much that can be done to promote alternative transportation modes, as outlined above. Other ideas will likely emerge from participants in the process as it unfolds. However, another avenue that can be pursued involves hiring a marketing consultant to assist with the advertising and promotional aspects of the program. These specialty professionals have expertise in this area and can provide ideas beyond those identified here and which respond specifically to the needs of Mashpee and its neighbors. Therefore, it would be desirable for Mashpee (or the proposed upper Cape TMA or another funding agency) to authorize a budget amount to be expended for this purpose.

Another item that fits into this category is the authorization of funding to provide the necessary alternative modal facilities to enable use by willing participants. Included are bus shelters, bicycle racks and storage lockers, various signage and pavement markings to designate bicycle lanes and routes, etc. This can take the form of Town funds but can also involve solicitation of grants and donations from public and private sources. Employers and businesses in the affected area can be solicited for contributions. Public agencies can also be used to identify state or federal programs (including ISTEA) that permit funding for these types of improvements.

**Computerize:** Computers have been a productivity tool for many years, but today they are being used in new and interesting ways. With the increase in popularity of the Internet and, particularly, the World Wide Web (WWW), opportunities exist to disseminate information quickly, widely and effectively, as well as to promote issues and expand participation in activities and events. One means to do so is through Mashpee's "home page" on the WWW or, perhaps more effectively, via one developed for the upper Cape region. It could offer facts about area attractions to residents and prospective visitors and, most importantly, provide important information on travel to and through the area that emphasizes alternative modes.

The computer is also an excellent means to help obtain information of the type described earlier under "Utilize." Using the search capabilities of the Internet, as well as various message boards and forums, can yield a wealth of up-to-the-minute information on what other communities, agencies or other jurisdictions have achieved or are in the process of testing, along with both good and bad points associated with their experiences.

**Standardize:** Implementing multimodal services and facilities will be most effective if standard procedures, rules and criteria are developed and applied, another reason why a regional TMA would be beneficial. Uniform standards for bicycle, bus, pedestrian, parking and other transportation elements will ease the implementation process in terms of time, cost, safety, aesthetics and environmental impact. Published guidelines for these types of facilities exist but they are not necessarily in agreement in terms of standards. Coordination on achieving planning and design standardization among the region's communities should be sought. Promotional standards should also be developed in terms of what to market and how to go about doing so.

**Recognize:** Recognize that it will not be possible to accomplish all goals and objectives within too short a time frame. It is often difficult to change people's attitudes and, especially, their travel habits. Also recognize that alternative transportation modes, although valuable and necessary, will not solve the entire transportation problem in Mashpee or the surrounding area and will not preclude the need for road improvements. Rather, they can extend the useful life of capital construction measures. Most people are motorists, so it is usually self-defeating to antagonize this group by creating an "attack" atmosphere against them. Drivers may be more apt to respond to initiatives that are presented in terms of balanced or supplemental transportation rather than prohibitions or illogically severe restrictions on automobile use. The Town should also recognize, as stated earlier, that it will have to back up any program of alternative mode use with a sincere effort on its part to manage growth within its own borders and work with neighboring communities to do the same. That is why creating a regional Transportation Management Association is important. Establishing a dialog on traffic problems while fostering a climate of uncontrolled growth that causes some of those problems will most likely not result in their successful resolution.

## *Recommended Policies*

Chapter 9 of the Plan identifies the following recommended policies, which are intended to be expressed either through new or revised bylaws and regulations, or through ongoing regulatory, construction and other activities of Town boards and departments. They are intended to be formally adopted principles that will guide the process of achieving the goals and objectives specified in Chapter 3.

### IT SHALL BE THE POLICY OF THE TOWN OF MASHPEE:

1. To require that appropriate transportation impact studies be performed a part of the permitting process for all major residential, commercial and industrial projects. Such studies shall include analysis of the energy, pollution and safety impacts of the project and any proposed mitigation measures. Major projects shall be defined as those which would generate more than 250 trips per day or 25 trips during the project's typical peak hour or which would qualify as a Development of Regional Impact under the regulations of the Cape Cod Commission.
2. To require that the proponent of any new development or redevelopment project subject to approval by the Planning Board or Zoning Board of Appeals demonstrate, prior to the issuance of any approvals or permits, that there will be no degradation of traffic safety at any time of year as a result of the development of the project.
3. To require that the proponent of any new development or redevelopment project subject to approval by the Planning Board or Zoning Board of Appeals demonstrate, prior to the issuance of any approvals or permits, that said project will not degrade travel times, level of service, intersection delay, volume to capacity ratio, reserve capacity or any other performance indicators for surrounding roadways or intersections on an annual average peak hour basis as defined in the most recent edition of the *Highway Capacity Manual* published by the Highway Research Board.
4. To require that new development and redevelopment mitigate any traffic impacts it creates and that it provide such mitigation concurrently with such development or provides an equitable contribution of funds to the appropriate Town or other agency for such mitigation measures. Major projects shall mitigate all year-round and summer transportation impacts created by such development on all public ways or intersections of public ways where project traffic is expected to add 25 new vehicle trips or more during the project's typical peak hour. For public ways and intersections within Certified Growth / Activity Centers, this threshold is increased to 50 trips or more during the project's typical peak hour. Traffic operations at all locations meeting or exceeding these thresholds shall be made no worse as a result of the development, based on the performance indicators stated in policy 2. Mitigation strategies may include both structural and non-structural improvements, with special emphasis on alternatives to private automobile transportation. Peak summer traffic shall be mitigated through Transportation Demand Management (TDM), Transportation Systems Management (TSM) and access management strategies. For Developments of Regional Impact (DRIs) and other major projects, MEPA's Guidelines for Traffic Impact Assessment (for local roads) and the Massachusetts Highway Department's access requirements, standards and policies (for state roads) will be used as a guideline in determining appropriate traffic mitigation and the guidelines developed by the Cape Cod Commission will be used to determine any fair-share contribution of funds for off-site mitigation. For smaller projects, mitigation shall be as required by any impact fee regulations adopted by the Town (and approved by the Cape Cod Commission) and as required by the local board having approval authority for the project under the Town's Zoning Bylaws or Subdivision Regulations.
5. To require that any new transportation facilities or improvements, or transportation mitigation measures related to new development and redevelopment conform with the County's latest Regional Policy Plan and any other applicable State, County and Town regulations, policies or plans.

6. To require that major projects, as defined above, institute appropriate measures to offset at least 20 percent of their projected traffic volumes. Such reductions may be demonstrated through traffic studies indicating reduced traffic through shared trips or other factors, by construction of interconnects with adjacent properties, by provision of on-site employee housing or alternative transportation facilities and services such as bikeways, sidewalks, carpool programs, shuttle bus service, etc., by ongoing monetary contribution to an approved public or private transit agency to provide transit services to and from the site or by other appropriate means approved by the Town.
7. To require that new development and redevelopment enhances opportunities for safe and convenient pedestrian and bicycle traffic to and within the site.
8. To require that new development and redevelopment provides any necessary facilities needed to permit or enhance public transit services where appropriate.
9. To require that any new transportation facilities or improvements shall be consistent with community character, shall not degrade safety and historic, scenic or natural resources, and that they minimize noise, light, dust, localized air pollution and other negative impacts on neighboring land uses.
10. To incorporate appropriate provisions for safe bicycle and pedestrian movement in any new roadway construction and major reconstruction projects, including intersection reconstruction and signalization. The recommended bicycle facilities described in Section 8.A. and on Map 8-2 of this Transportation Plan and the recommended pedestrian facilities described in Section 8.B. shall serve as the basis for any such improvements on roadways covered by the Plan where appropriate.
11. To establish and maintain a coordinated network of bicycle facilities, sidewalks and footpaths throughout the Town as described in Chapter 8 of this Transportation Plan to promote bicycling and walking as alternatives to automobile trips and as recreational / visitor amenities through development of new facilities, linkage of existing facilities, improvement of road crossing safety, public education and other appropriate means.
12. To provide bicycle parking facilities at existing public facilities including town buildings, schools, parks, beaches and commercial and industrial developments and to require the provision of such facilities in all major new private development projects as appropriate.
13. To coordinate Mashpee's transportation facilities and services, including roadways, transit services and bicycle and pedestrian facilities, with those of neighboring towns.
14. To ensure that public transportation facilities and services are available to provide mobility for those without ready access to private transportation and to reduce motor vehicle use through the development and enhancement of public transit and taxi services both within the Town and connecting with major destinations outside Mashpee.
15. To require that drainage facilities associated with any new parking area or roadway construction or major reconstruction be designed and constructed both to properly redirect stormwater from roadways to maintain safe travel conditions and to ensure that such runoff does not adversely affect groundwater and surface water quality and pond, stream, estuarine or wetland ecology.
16. To encourage mixed commercial and residential development provided that it does not increase overall traffic in the Town.
17. To prohibit the development of new driveway curb cuts on major roadways except where no feasible alternative site access is possible.
18. To encourage shared parking facilities and limit excessive parking spaces where feasible to reduce pavement coverage. Where appropriate, adequate off-site private or public parking may be substituted for on-site parking.
19. To encourage the creation of secondary road networks through interconnection of subdivision streets and other roadways in order to reduce traffic congestion on major roadways.
20. To require that all new development or redevelopment and any transportation facilities and services provide proper access for disabled persons.
21. That appropriate landscaping and screening shall be provided along roadways, in medians and in parking areas to maintain and improve the Town's visual environment.

22. That roadway and parking facility lighting shall be designed so as to minimize off-site impacts and degradation of the dark night sky.
23. To require that, regardless of project size or traffic generation, new street or driveway access / egress onto public ways shall follow accepted access management practices, guidelines and policies. Sight distance for developments on high speed or high traffic roadways (collector and arterial streets) should meet sight distance requirements regardless of traffic generation and new single family homes with blind driveways should be avoided on such roads. In addition, for access / egress at other than individual single or two family homes: 1) measured sight distances at such locations shall, at a minimum, meet Massachusetts Highway Department and American Association of State Highway and Transportation Officials standards for safe stopping sight distance, 2) all new driveways on collector or arterial streets shall operate at Level-of-Service C (or Level-of-Service D in certified growth / activity centers) or better as defined in the Highway Capacity Manual, based on appropriate year-round design hour traffic volume and 3) the consolidation and sharing of curb cuts for existing or proposed developments is strongly encouraged.
24. That all future bicycle facilities should be constructed according to the design guidelines specified in the Massachusetts Highway Department's Highway Design Manual and their manual entitled *"Building Better Bicycling"* (1994) along with the three primary documents on which their recommendations are based, the AASHTO *"Guidelines for the Development of Bicycle Facilities"* (1991), the FHWA *"Manual on Uniform Traffic Control Devices (MUTCD)"* (1988 and as updated) and the FHWA manual entitled *"Selecting Roadway Design Treatments to Accommodate Bicycles"* (1994), or subsequent updates to those publications, unless topographic or other physical constraints make meeting those design guidelines infeasible.
25. To maintain the Town's roadway system at a Pavement Condition Index of 85 or better.
26. That existing public rights-of-way shall be preserved for transportation and other public access uses.
27. To require that internal site circulation and access / egress for new development and redevelopment projects shall be designed to minimize impacts on the adjacent road system.

## *Action Plan*

Chapter 10 summarizes specific recommended actions and projects, described in a Five Year Plan and a Long Range Plan, directed primarily toward incremental improvements to our roadway system, construction of a network of bicycle and pedestrian facilities, promotion of non-auto travel, revision of local land use and other regulations, organizational recommendations and related topics.

It should be noted that the Action Plan is not intended to deal extensively with ongoing maintenance or repaving activities undertaken by the Town or other agencies, but to deal primarily with new transportation facilities or reconstruction of existing facilities that increases their capacity. Certain roadway repaving and reconstruction projects recommended by the Public Works Director for funding over the next five years have been included primarily to provide a clear picture of the major capital expenses that they entail in addition to those necessary to develop new projects or increased system capacity. Other ongoing roadway repaving and maintenance activities should be undertaken by the Town in conformance with the 1995 *Roadway Management Study* prepared for the Mashpee Department of Public Works by Vanasse Hangen Brustlin (VHB), Inc. and the roadway / pavement management program recommendations of the Director of Public Works.

### Five Year Plan

The following is a listing of projects and activities that the plan recommends should be completed, *or at least begun*, during the next five years. It is based on our goals, objectives and policies and the

recommendations of VHB and the Bicycle Planning Subcommittee, tempered by fiscal constraints, staff limitations and the realities of the permitting and approval process.

Where construction cost estimates are provided, they exclude right-of-way, design, and construction services costs and were derived by VHB after developing a 1995 cost-per-linear-foot for each of the road cross-section types identified as potential, then multiplying the length of each segment needing improvement by the appropriate unit cost (see Appendix E). A range is given due to the many variables affecting the layout and design of each segment (e.g., retain existing pavement vs. full-depth reconstruction, drainage or other utility needs, structural considerations, sidewalks, bicycle lanes, etc.). The figures also exclude intersection improvement costs. Intersection treatments, as identified separately, must be added to obtain total estimated construction costs for each segment of a roadway.

**Route 28 should be widened to four lanes between Donnas Lane and the Rotary**, with a landscaped median of at least 12 feet in width and four foot paved shoulders, as part of the expansion of the Mashpee Commons project ($0.21-0.3 million state / private funding).

**Efforts should begin immediately to acquire the needed right-of way for eventual widening of all of Route 28 to four lanes at some future date as traffic requires and as funding permits.**

**Improvements should be made at the intersections of Route 28 with Industrial Drive, Deer Crossing entrance, Shellback Way, Donna's Lane / Job's Fishing Road, Steeple Street Orchard Road and Noisy Hole / Sampson's Mill Road** as recommended in the VHB technical report by 2004 and described in Table 6-7 and Map 7-2 ($0.49-0.66 million - state / private funding). The majority of these improvements are required as a result of new development proposed at the Mashpee Industrial Park, Talanian_property (flea market site), Mashpee Commons and Willowbend and would be largely funded by those projects' proponents.

**A new "East Steeple Street" connector should be constructed between Route 28 and Great Neck Road South** ($0.10-0.15 million - privately funded as part of the Mashpee Commons project). The Route 28 / Steeple Street intersection should also be signalized as noted above. Use of a modern roundabout intersection at the Great Neck Road South / proposed East Steeple Street / Boch Center entrance intersection should be seriously considered both to provide proper traffic flow before and after Boch Center events but also to "calm" (slow) traffic in this area, which is proposed for high density pedestrian oriented development by the developers of Mashpee Commons.

**Donna's Lane should be upgraded** to provide turn lanes at all intersections, including new driveway entrances onto adjacent properties as they are developed (private funding by the Talanian and Mashpee Commons projects through CCC DRI and local permit requirements). In the long term, a roundabout intersection might also be appropriate, rather than the traffic signals proposed by VHB, at the intersection of Donna's Lane with Great Neck Road South and the entrance to the Windchime Point Condominiums.

**The police / fire station entrance drive should be realigned opposite Job's Fishing Road, with a signalized intersection at Route 151** ($0.14-0.16 for intersection and signalization - Town / state grant / private funding w/ Mashpee Commons). **This project should be undertaken in conjunction with the westward extension of "Picabo Street" by the owners of Mashpee Commons, which could intersect the new roadway at a new roundabout intersection** to minimize traffic backups which could occur with a signalized or stop sign controlled intersection. Limiting such backups will be critical to ensuring that emergency vehicles from the police and fire stations are not obstructed. Mashpee Commons has committed to fund the reconstruction of the existing Police / Fire entrance road at a location opposite Jobs Fishing Road and half the cost of signalizing the resulting intersection. The Town has submitted a Public Works

Economic Development (PWED) grant application to the state to fund the full cost of signalization and the addition of turn lanes on Route 151.

**A new connector street should be constructed parallel to Route 28 between Industrial Drive and Donna's Lane / East Steeple Street** (see Map 7-1) to relieve traffic pressure on Route 28 and provide alternative access routes for local traffic. ($0.4-0.7 million - public / private funding w/ owners of the Talanian, Otis and Rogers properties). **Funding and construction would be done in phases by 2010 as part of the development of the commercial and industrial properties crossed by the roadway. The Town should lay out this roadway as part of an Official Map adopted by the Planning Board and coordinate its development with the landowners involved.**

**A new connector should also be constructed between the above new street and Great Neck Road South** opposite the entrance to the Sandalwood subdivision when the Heirs of Elise Otis property is developed ($0.1-0.15 million - private funding as part of Otis development).

**Route 151 should be widened to four lanes between Job's Fishing Road and "Market Street"** ($0.19-0.27 million public / private funding w/ Mashpee Commons). A second eastbound lane in that area is particularly critical to deal with current summer backups and allow free right turns into Mashpee Commons at Market Street. If that lane addition is done at the same time as the proposed reconstruction of the 151 / Job's Fishing Road intersection, which will include a second westbound lane for left turns over a portion of this road segment, it may be most cost effective to simply extend that westbound lane back to Market Street at the same time, rather than a separate later project. Doing so would bring this section of road to its final required "buildout" configuration.

**Construct improvements to the Route 151 intersections with Market Street, Job's Fishing Road and Old Barnstable Road** as recommended in the VHB technical report by 2004 and described in Table 6-7 and Map 7-2 ($0.48-0.56 million - Town / state / private funding).

**In order to relieve current and potential future traffic flow and safety problems, the Town should seriously consider reconstucting the Route 130 / Great Neck Road North intersection as a modern roundabout.** (See Long Range Plan and Section 7.B. for further information. No cost estimate has been made at this time.) A design study should be pursued in the next few years and any necessary additional right of way, if any, should be acquired, with actual construction either within or slightly beyond a five year time frame. This project, would provide for all long range traffic needs while avoiding the high cost and visual disruption of this proposed historic district which would come with signalization and the addition of turn lanes, the only other potential long-range solution to traffic problems at the intersection (projected to cost $.14-.17 million by VHB). Mere reconfiguration to a stop sign-controlled "T" intersection is possible in the short term, but will not be adequate to deal with projected traffic volumes for more than a few years.

**Noisy Hole Road should be laid out and reconstructed between Route 28 and Burning Bush Road** to relieve projected traffic overloads on Great Neck Road North and provide more efficient traffic circulation patterns in the eastern portion of the Town ($0.2-0.3 million public / betterment funding). 90 percent of the right of way needed for reconstructing the currently unpaved portion of this roadway is currently owned by the Town and held by the Selectmen for use as a 60 foot wide street right of way. The remainder of the northern portion of this road section was laid out to allow a 50-foot right-of-way for future use as a through road.

**Simons Road should be reopened and constructed between Sampson's Mill Road and the intersection of Route 28 and Noisy Hole Road** ($0.2-0.3 million public / private funding, excluding signals). Full engineering designs have been completed and 50% of the funding for both the road and signals at Route 28

is required to be paid by the developers of the Willowbend project as a condition of their special permit approval by the Planning Board. That condition expires in April of 2003. While some neighbors have objected to the concept, existing traffic safety problems at the current poorly-aligned intersection of Route 28 and Sampson's Mill Road will become even more critical as Route 28 traffic increases, and practically insurmountable when that road is expanded to four lanes. This proposal, upon signalization, provides what appears to be the most feasible safe alternative. In addition, **a connector road to Bowdoin Road and Cape Drive could also be considered in the long term** to provide a safer alternate Route 28 access for traffic originating on those roads. In order to reduce neighborhood concerns about potential through traffic on Sampson'd Mill Road, **closure of the narrow Santuit River bridge to motor vehicles should also be considered**, along with Willowbend's planned gating of their Willowbend Drive entrance.

**4-6 foot shoulders should be added to Route 28 between the rotary and Quinaquisset Ave.** to provide safer passage for bicyclists on the most heavily used portion of the Town's roadway system ($0.12-0.17 million state funds for 0.45 miles). **This project was the top priority of the Bicycle Planning Subcommittee.**

**4-6 foot paved shoulders should be constructed along Route 151 between Jobs Fishing Road and the rotary** to provide safe bicycling for "Group A" cyclists ($0.1-0.15 million Town / state aid / developer funds).

The "Southport" project is required by the conditions of their January, 1985 Board of Appeals Special Permit modification decision to provide for the **reconstruction**, including all costs, **of Old Barnstable Road between Route 151 and a point 1050 feet north of Route 151** prior to the issuance of the 301st building permit as well as provide an additional 20 feet of right-of-way between their entrance and Route 151 and 10 feet between their entrance and Payamps Road, along with additional right-of-way area in the vicinity of their entrance to allow straightening of Old Barnstable Road. **The required reconstruction is to include left turn lanes of 12 feet in width at the intersections of Old Barnstable Road with Route 151 and with the project entrance, as well as 11 foot travel lanes and 4 foot paved shoulders and berm along the entire section of road to be reconstructed. Further extension of the reconstruction to Payamps Road** is required prior to the issuance of their 401st building permit. Based on the likely building schedule of the Southport project, that reconstruction is likely to occur within the next five years. (Another condition requires that Southport fund the installation of traffic signals at the intersection of Route 151 and Old Barnstable Road prior to the issuance of their 501st building permit, although that signal is scheduled to be installed by the state in 1998, well before this condition would kick in.)

**In addition, the following road reconstruction projects are included in the DPW Director's recommended $4,500,000 five year road bond and should be included in capital facilities planning for the Town** (all costs are full costs, including engineering and other items):

- South Sandwich Road - reconstruct and widen 2 feet, add drainage ($400,000)
- Pimlico Pond Road - reconstruct, widen and add drainage ($200,000)
- Sampaon's (Old) Mill Road - reconstruct, add drainage ($200,000)
- Old Barnstable Road (Rt. 151 - town line) - reconstruct, add drainage ($350,000)
- Old Barnstable Road (Lowell Rd. - Rt. 151) - reconstruct, widen 3 feet, add drainage ($400,000 - but note the above responsibility of the Southport project to fund approximately half of a more significant upgrade to the southern half of this road section)
- Lowell Road - reconstruct, widen 2 feet, add drainage ($300,000)
- Hooppole Road - reconstruct, widen 2 feet, add drainage ($400,000)
- Great Neck Road North (Rt. 130 to Lowell Road) - resurface road and "bikeway" ($150,000)
- Cotuit Road (both sections) - resurface, add drainage ($250,000).

**An 8-10 foot bicycle path should be constructed along the north side of Route 151 from the fire station to James Circle**, following the former location of Bates Road east of the Quashnet River and a routing west of the river which meanders off and on the existing 100-foot right-of-way to provide for attractive and safe bicycling for "Group B & C" (less experienced adult and children) bicyclists away from high-speed Route 151 traffic ($250-300,000 Town and / or state grant funds). Funding for this bike path, which would provide access for high school students and others to jobs at Mashpee Commons, has been included in the PWED grant application noted above relative to the Jobs Fishing Road extension project. The first section of this path, from the fire station to Old Barnstable Road, is also included in the DPW Director's proposed five year road bond at a full cost of $175,000. Funding assistance might also be sought as part of DRI traffic mitigation for the Mashpee Commons project.

**A new 8-10 foot wide bicycle path should be built along the west side of Great Neck Road South between Donna's Lane and Red Brook Road,** using existing Town lands and other abutting open space to allow a route which meanders on and off the existing 60-foot right-of-way to allow a safer and more attractive recreational biking experience (VHB estimate $230-290,000 Town / state aid / private funds). This project was the top bike path choice of respondents to the Town's 1992 public opinion survey and has been included in the DPW Director's proposed five year road bond at a full cost of $375,000. Funding assistance may be appropriate as part of DRI mitigation for the proposed 160,000 square foot shopping center on the Talanian property and / or the Mashpee Commons project.

**The existing bicycle path on Donna's Lane should be extended 200 feet west to Route 28** ($3600-$4600). This project will be completed when the existing miniature golf course on the Talanian (flea market) property is moved as part of the construction of the proposed shopping center on the site.

**A new bicycle path should be constructed along Job's Fishing Road from Route 28 to Route 151** ($66,000-85,000 private funds). An 8-foot-wide bike path was included in the original plans for the road by the developers of Mashpee Commons. When their plans for the area were later changed under a "neotraditional" neighborhood concept, the path was revised by agreement with the Planning Board to become a 14-16 foot wide multi-use sidewalk. Either approach would be acceptable, provided that the latter is clearly designed and signed for use by bicyclists.

**A separate bike path facility should be constructed along the east / south side of the section of Route 28 between Martin Road in Falmouth and the rotary** to accommodate "Group B & C" bicyclists. Preliminary surveys have been begun by MHD toward the development of such a facility. VHB estimated the construction cost of this 10-foot-wide bike path project to be about $180,000 for the section between Donna's Lane and Polaris Drive. A portion of this path near Donna's Lane is included in preliminary plans for development of the Talanian (flea market) property.

**Extension of the Route 130 shared sidewalk / bike path from Heritage Park to Pickerel Cove Road** is included in the DPW Director's five year road bond proposal, at a full cost of $200,000.

The DPW Director has included $150,000 for constructing a **bikeway along Great Neck Road North between the Senior Center and Lowell Road** in his proposed five year road bond. This is the alternative routing to the Lowell Road - Coombs School route recommended by the Bicycle Planning Subcommittee.

**The Town should provide adequate equipment and staffing to allow regular cleaning, leaf removal, snow plowing and maintenance of bicycle facilities and sidewalks in order to ensure safe conditions for bicyclists and pedestrians.**

**The Town should seek the expansion of Sea Line transit services to an hourly schedule using traditional heavy-duty transit coaches on the route.** (Estimated annual cost $130,000, capital cost for new buses $300,000 funded through the Cape Cod Regional Transit Authority.) The Transit Authority recently converted the route to more-traditional 29 passenger transit coaches.

**The "Mashpee Trolley" shuttle bus service should be refined and better advertized to promote increased ridership.**

An **informational brochure on alternative transportation facilities and services available** (or potentially developable), routes, schedules, costs, benefits of using alternative modes, etc., should be developed and disseminated through mailings or distribution at stores and businesses.

**Permanent information booths or kiosks should be established and appropriately located** (e.g., at Mashpee Commons) **where residents, visitors, and others can obtain travel-related information.** These facilities could be simple ones involving only printed material or could be more elaborate, incorporating either a staff person to answer questions or computer-based equipment of the type found at transportation terminals.

**The Town should adopt an "official map" of existing and proposed streets** under the provisions of Massachusetts General Laws Chapter 41, Sections 81-E through J. Such an official map would provide a means of protecting rights-of-way required for future road widening (as on Route 28) or for new roadways (such as the proposed Jobs Fishing Road extension or the street proposed parallel to Route 28).

**The Planning Board should amend its subdivision regulations** to update engineering requirements, provide drainage options, relate standards to roadway class, provide for on-street parking in densely developed areas, require sidewalks and curbing where appropriate, mandate water line construction when near existing lines, require street lighting at intersections and other locations where necessary for safety, include provisions for statutorily-authorized consultant review fees, update fees, provide for the use of traffic-calming features and otherwise bring the regulations up to modern standards and into conformance with the provisions of this Plan.

**Mixed use development, larger green space requirements and lower trip-generating uses should be encouraged** by the Town's zoning and other regulations in order to reduce potential future traffic levels.

Given the close relationship between parking supply and travel mode choice, **maximum, in addition to minimum, parking space requirements for various land uses should be adopted** as part of the Town's zoning regulations. The Town should coordinate with area developers in setting appropriate limits.

**The Town should institute an impact fee system** to cover the costs of transportation improvements made necessary by new development. The focus would be on providing incentives to encourage low-to-moderate intensity development, employer-based travel demand management measures and an equitable transportation mitigation funding source to alleviate the impacts of future development. Any such fee system will require approval by the Cape Cod Commission.

In addition to specific facility recommendations, the Town should **develop and utilize standard designs and detailed specifications for transitions between different types of bicycle facilities and road crossings**.

**The Department of Public Works should periodically update its roadway / pavement management plan and undertake recommended repaving and other recommended roadway maintenance projects as funding becomes available.**

**The Town should undertake an origin-destination study** to develop a better understanding of travel patterns within and through the town. It should include data for typical summer peak weekday and weekend conditions, as well as for off-peak "shoulder" seasons. Such information is necessary to establish basic parameters required for certain travel management actions, both town-wide and regional. The data could also serve as input to a town-wide (or possibly a joint Mashpee-Falmouth or upper-Cape) travel demand model, which would be desirable for future transportation planning activities and to validate some of the travel assumptions made as part of the VHB study.

Recognizing the regional nature of transportation problems and solutions, **the Town should work with the Cape Cod Commission, surrounding towns, local employers, and others affecting or affected by transportation facilities and services to develop a Transportation Management Association (TMA) involving Mashpee, Falmouth, Sandwich, Bourne, and Barnstable.** While the Town must manage growth within its own borders, it must work with neighboring communities to do the same and to provide for alternatives to automobile travel.

In order to ensure that the recommendations of this Plan are pursued and to serve as the basis for the Town's participation in the proposed regional Transportation Management Association, **the Town should appoint a Transportation Coordination Committee** to oversee all transportation-related activities in the town and to act as a contact with outside groups and agencies. The Committee should include the Public Works Director, Town Planner, Police Chief and representatives of the community appointed by the Selectmen.

**Funding Sources**

In addition to specific funding mechanisms noted above, a variety of funding sources are possible to implement these improvements. State programs include Chapter 90 and Public Works and Economic Development (PWED). All of the improvements listed above could be eligible for financing under these categories. However, funding is very limited. The former is an annual formula program whose funds can be accumulated from year to year and used for road improvements. The latter must be applied for on a project-by-project basis, with funding going to municipalities demonstrating the strongest connections between transportation infrastructure and economic need.

Federal programs are those included in the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. Title I of the act relates to surface transportation. Specifically, the Surface Transportation Program (STP) is a block grant type program that may be used by states and localities for any roads (including those constituting the National Highway System(NHS) that are not functionally classified as local or rural minor collectors. These roads are now collectively referred to as Federal-aid roads. Route 28, Route 151, Route 130, Great Neck Road North and South, Cotuit Road, Quinaquisset Ave., Red Brook Road and Great Oak Road improvements could apparently be funded from this category based on the roadway classifications identified on Map 4-3. The program is formula-based and includes components for safety construction activities (hazard elimination and rail-highway crossings) and transportation enhancements, which encompass a broad range of environmental-related activities. Enhancement funds are the best source for bicycle and pedestrian related improvement projects. Another ISTEA initiative is the Congestion Mitigation and Air Quality (CMAQ) improvement program, which directs funds toward transportation projects in Clean Air Act non-attainment areas for ozone and carbon monoxide. CMAQ funds are often used for alternative modes and traffic signal operational improvement projects. There are also Special Projects

designated within ISTEA (e.g., congestion relief, high priority corridors on the NHS, rural and urban access, priority intermodal, innovative projects, etc.), as well as the Scenic Byways Program.

A new transportation funding program to replace the ISTEA program is now being debated in the U.S. Congress, tentatively labeled "NEXTEA". The Town should coordinate with the Transportation Planning staff of the Cape Cod Commission and state highway officials to keep track of funding sources, to identify suitable funding opportunities for the projects recommended by this Plan and to obtain assistance in preparing necessary funding applications.

Other potential non-state / federal sources of funds include special permit project conditions, Cape Cod Commission Development of Regional Impact traffic mitigation requirements, impact fees and Town sources such as the five year road bond proposed by the DPW Director, which is similar to bonds approved in a number of nearby towns in recent years.

## Year 2010 Recommendations

The following projects are recommended for implementation before the year 2010.

**Route 28 should be widened to four lanes between the rotary and Meetinghouse Road**, (with 4-6 foot paved shoulders) including a reconstructed Mashpee River crossing and realignment of Quinaquisset Ave. opposite Meetinghouse Road ($0.69-1.26 million state / private funding w/ rotary area developers).

**4-6 foot shoulders should be added to the remainder of Route 28** to provide safe bicycling for "Group A" (experienced) bicyclists as part of the next repaving / reconstruction of that roadway ($0.9-1.3 million state funds for 3.5 miles).

**Improvements should be made at the Route 28 intersections with Quinaquisset Ave. and Meetinghouse Road** as recommended in the VHB technical report by 2004 and described in Table 6-7 and Map 7-2 ($0.14-0.18 million - state / private funding).

**Rather than eliminate the rotary totally or leave it as is** until eventual replacement by a four way signalized intersection in the "long term" as suggested by VHB and the Cape Cod Commission, **it is proposed that the Town request that state highway department consider reconfiguring the rotary to operate as a modern "roundabout".** Roundabouts are much safer than unsignalized intersections and have been proven considerably safer than signalized intersections. They have achieved 50-90 percent reductions in collisions compared to equivalent intersections using 2 or 4-way stop signs or traffic signals. Roundabouts can also be less costly to construct than signalized intersections, unless they are very large. A typical signalized intersection can cost up to $100,000 for the signals and signal engineering alone, plus additional large sums for roadway construction to add turn lanes and other improvements. A typical signal installation also costs $3000 per year for electricity, maintenance of loops, controller, signal heads etc. The traffic capacity of a roundabout will usually be higher than a signalized intersection because there are no yellow and red times (lost time). Because they usually reduce the number of stops drivers have to make, compared with stop signs and signalized intersections, roundabouts can also change drivers' perception of travel times. Reduced stops translate to less driver frustration even if actual travel times are not changed. The appearance of a roundabout, particularly if attractively landscaped, can be a tremendous improvement aesthetically over a signalized intersection by eliminating the clutter of overhead wires and signal poles, often allowing signage to be reduced. In addition, they can provide distinctive landmarks or entry points to a community or neighborhood, providing opportunities to create symbols of an area's identity and special character.

**That section of Route 151 between the Jobs Fishing Road and Old Barnstable Road intersections should be widened to three lanes by 2010**, with the center lane serving as a passing lane in the uphill directions on either side of the Quashnet River and then becoming a turn lane at each of those (future signalized) intersections.

**Paved shoulders should be increased to at least 4, and preferably 6, feet along the entire length of Route 151 by 2010** to accommodate on-road bicyclists, to provide an emergency breakdown area (in conjunction with another 4-6 feet of graveled shoulder) and to allow temporary operation of an extra traffic lane during the Barnstable County Fair.

**Construct improvements to the Route 151 intersections with Algonquin Ave., Ninigret Ave. and James Circle / Winslow's Road** as recommended in the VHB technical report by 2004 and described in Table 6-7 and Map 7-2 ($0.04-0.06 million - Town / state / private funding).

**An upgraded two lane cross section is recommended for Great Neck Road North between the rotary and Lowell Road**, including twelve foot travel lanes and four foot paved shoulders for "Group A" bicyclists, which could be striped at 11 and five feet respectively to improve bicyclist ($0.3-0.6 million Town / state aid funds). Shoulder widening may have to be more limited or not done at all in the area of the traditional town center due to street trees and limited area available for the proposed adjacent bicycle path / shared sidewalk reconstruction of the sidewalk along the west side of the road. **These improvements should be made incrementally before 2010 as part of intersection improvement projects and as a reconstruction of the roadway when it next requires repaving.** 4 foot shoulders could safely accommodate "Group A" bicyclists if the posted speed limit is set no higher than 40 mph in any section. Under those conditions, the road could be signed as a bicycle route.

**Reconstruct the Great Neck Road / Lowell Road intersection** as suggested by VHB and described in Table 6-7 and Appendix H ($.06-.07 million).

**Add left turn lanes at the intersections of Great Neck Road North and Old Barnstable Road and Ryan's Way** as traffic levels and safety problems warrant ($.05-.06 million for both).
**4-foot shoulders should be added on Route 130 west of Echo Road.** Such shoulders would accommodate "Group A" bicyclists and allow that section of the road to be signed as a bicycle route. VHB's recommended roadway improvements to deal with traffic increases on that road also include such shoulders. **That widening might also be extended east to Lovell's Lane in the long term if traffic conditions warrant.** East of Lovell's Lane any shoulder widening would have to be limited to two feet, if anything, in many areas to avoid removal of street trees or other disruption of that scenic / historic section of the Town's traditional Main Street. Such widening is not recommended by this plan. **Left turn lanes should be added at the Pickerel Cove Road, Echo Road, Ashumet Road, Great Neck Road** (not necessary if this intersection is converted to a roundabout), **South Sandwich Road** (also unnecessary if a roundabout is built), **Cotuit Road** (again, not necessary if a roundabout is developed) **and Stratford Ponds intersections, when traffic and accident data warrant, and at major commercial or industrial driveways. In addition, the creation of new driveways should be limited to the minimum possible, existing driveways should be consolidated where possible and adjacent commercially zoned land should be rezoned to prevent development of any large traffic generators.** These changes should be made incrementally as part of repaving or intersection improvement projects over the next 10-20 years.

**In addition to those specified previously in the 5-year plan, the use of roundabouts rather than signalization should also be considered, instead of traffic signals listed in the VHB recommendations for intersection improvements** (see Table 6-7 and Maps 7-2 and 7-3) **or the existing conditions, at a number of other intersections**. Those intersections where such an approach appears to be particularly

appropriate, having a reasonable balance between traffic flows on each leg, having current safety or traffic flow problems, being in areas where signals might be unattractive or overkill, and / or providing opportunities to maintain or create attractive community or neighborhood landmarks, are Route 130 / Cotuit Road, Route 130 / South Sandwich Road, Great Neck Road South / Red Brook Road / Great Oak Road, Quinaquisset Ave / Mashpee Neck Road / Orchard Road and Rock Landing Road / Wading Place Road.

**A new bicycle path / shared sidewalk should be constructed between Route 130 and Mashpee Commons.** (See DPW Director proposal in 5-year plan.) The Bicycle Planning Subcommittee's recommended routing for this path is as a widening to 5-8 feet of the existing 3-foot wide sidewalk along the west side of the road between Route 130 and Lowell Road, with minor relocations to safely pass existing large street trees ($115-150,000) and a new 8-10 foot wide path along Lowell Road and Great Hay Road to connect with the existing bicycle path near the Coombs School ($140-170,000). If the sidewalk widening is implemented, the path should not be signed as a bicycle route unless it is at least 8 feet wide and adequate separation from the roadway (5 feet is recommended by the MHD) is provided. (The existing sidewalk and asphalt curb abut the roadway with no separation.) Such separation or, alternately, a physical divider as specified by the MHD Highway Design Manual, should be provided wherever feasible. Other optional routings are described in Section 8.A. of this Plan. Because environmental and existing development constraints may pose a major impediment to roadway widening to provide 4-foot shoulders, a separate bicycle path, and / or additional turn lanes along much of Great Neck Road North north of Lowell Road, the road widening suggested by VHB should not be implemented, or should be limited to two feet where done at all, with bicyclists expected to use the proposed widened sidewalk. Proper design of this bicycle path / shared sidewalk and separation from the roadway is therefore critical for bicyclist safety. More detailed feasibility studies will be required to determine the potential impacts of widening the existing cross section and whether one of the alternative bike path locations is preferable. ($200-260,000 Town / state aid / private funds)

**A bicycle path should be constructed from the rotary area, across the Mashpee River on an abandoned section of Old Route 28 and continuing roughly parallel to Quinaquisset Ave. through the Mashpee River Woodlands and along the former Simons Narrows Road to Mashpee Neck Road.**

**A bike path should be constructed along Great Neck Road South north of Donna's Lane**, or any other alternate routing which would connect the Donna's Lane and proposed Great Neck Road South bike paths with the proposed bike path crossing the Mashpee River noted above. This project should be designed and constructed as part of the development of Mashpee Commons' proposed "Trout Pond" neighborhood.

**Meetinghouse Road should be designated as a bike route, with possible shoulder widening to 2-4 feet** at some future date if traffic increases reduce bicyclist safety. Should a new school be built behind Town Hall, a bike path connection to the school and the Route 130 path could be built to divert bike traffic from the dangerous Great Neck Road North / Meetinghouse Road intersection. If the recommended relocation of Quinaquisset Ave to a signalized intersection with Route 28 and Meetinghouse Road is constructed, this route could be connected to the proposed bike path crossing of the Mashpee River to provide an attractive north / south bike route alternative to Great Neck Road North.

**At the New Seabury entrance between Great Neck Road South and Rock Landing Road, then extending to Daniel's Island Road, a new 8-10 foot bike path is recommended** to accommodate class B and C cyclists in that congested area. **The currently closed section of Daniel's Island Road, which extends to By-the-Green Way could also then be rehabilitated as a bike path.**

**The existing partially paved 2-4 foot wide paths along the west sides of Rock Landing Road and Wading Place Road could be paved and widened to 5-8 feet** to accommodate bicycles.

**A transit center should be developed** at Mashpee Commons or some other location in the vicinity of the Rotary. The center should provide at least three to four bus bays, a covered passenger waiting area (shelter) and information kiosks.

The Department of Public Works should continue to periodically update its roadway / pavement management plan and undertake recommended repaving and other recommended roadway maintenance projects as funding becomes available.

## Long Range Plan

Major roadway projects are not funded, designed, permitted or built quickly. Therefore, most of the recommendations of this plan relating to construction of new facilities are necessarily long range items and cannot be built within the next five years. Some projects recommended here should be phased, involving construction both within and beyond the five year horizon. Of necessity, this long range plan also involves fewer specifics and should be considered a flexible outline of activities which need to be regularly reconsidered, particularly as part of the five year update cycle of the Town's Comprehensive Plan. In that context, **this Plan's recommendations for long range projects and activities are as follows:**

**The ultimate buildout configuration of Route 28 should be that of an undivided four lane roadway** except where additional turn lanes are required to maintain safety or achieve adequate capacity at intersections, or where medians are added for traffic safety or aesthetic reasons or to provide pedestrian refuges in the potentially densely-developed area of Mashpee Commons. In the latter case, **a landscaped median having a width of at least twelve feet is suggested between Donna's Lane and the rotary.** Construction cost to provide four lanes between Metoxit Road in Waquoit and the Barnstable town line is estimated to be $3.2-4.6 million, which would likely be funded by the state with assistance from private funds required for DRI projects by the Cape Cod Commission or by Town-collected impact fees. This widening should be done on an incremental basis as traffic growth warrants, as funding permits and as projects are developed on adjacent lands. Two such increments are included in the proposed Five Year Plan.

**Additional intersection improvements should be made along Route 28** as recommended by the VHB technical report at buildout. The VHB-prepared plans contained in Appendix H of the full text of this plan were prepared for concept and rough cost estimation purposes and should not be considered recommended final designs.

**In order to accommodate the required widening of Route 28, 20 - 40 feet of additional right-of-way width will have to be provided along its entire length in Mashpee**. This can be accomplished through purchase, through donation from abutting landowners, through traffic mitigation requirements on large abutting projects or through adoption of an "official map" as suggested in the Five Year Plan.

**An effort should be made to consolidate and reduce the number of driveways entering onto Route 28** to reduce points of conflict with left turning vehicles.

**Prohibitions on left turns from Route 28**, as has been done at its intersection with Quinaquisset Avenue, or physical and signage restrictions on left turns out of a site, as at the Mashpee Commons entrance closest to the rotary, **should also be put into place where necessary to reduce conflicting traffic moves**.

**The installation of traffic median barriers,** beyond the landscaped median near the rotary mentioned above, **should be considered where they are the only potentially effective means of reducing left turn**

**movements.** If such medians are installed over large stretches, "jughandles" or other means of reversing direction at a signalized intersection should be developed.

**Parallel roadways to Route 28 should be developed, along with bypass roads around the Mashpee rotary area,** with the intent of reducing traffic on Route 28 and the rotary by providing alternative routes for local traffic and of allowing local residents a means of avoiding summer congestion on the main roads. **These include the construction of a new commercial street parallel to Route 28 between Industrial Drive and East Steeple Street, a connection from that new street to Great Neck Road South opposite Amos Landing Road, an easterly extension of industrial drive to Great Neck Road South and extension of Job's Fishing Road north to Old Barnstable / Lowell Roads.** All but the Industrial Drive extension are listed as Five Year Plan projects because of the rapid development of the area which threatens to foreclose many routing options and could make some of these projects impossible. Based on VHB's cost estimates, these projects should cost $0.95-1.55 million, some of which would be funded privately as part of new development projects. **In addition, other connections should be established between existing and proposed developments in the rotary area** such as Deer Crossing, the proposed Talanian Realty shopping center (at the current flea market site) and the various neighborhoods of the Mashpee Commons project, specifically including an extension of Seapit Way to connect Shellback Way and Jobs Fishing Road.

**Right-turn-only access to Route 28 from the Mashpee Commons "Trout Pond" neighborhood** could provide some alternate route relief for Great Neck Road South traffic heading east on Route 28 as well as access to that neighborhood without introducing the problems that left turns could cause on Route 28. **Only similarly restricted access to the properties on the north side of Route 28 in this area should be allowed, again to avoid left turn conflicts. In addition, a barrier median in Route 28 between the rotary and Quinaquisset Avenue should be constructed to reinforce this left turn prohibition.**

**Rather than eliminate the rotary totally or leave it as is** until eventual replacement by a four way signalized intersection in the "long term" as suggested by VHB and the Cape Cod Commission, **it is proposed that the rotary be reconfigured to operate as a modern "roundabout".** Roundabouts are much safer than unsignalized intersections and have been proven considerably safer than signalized intersections. They have achieved 50-90 percent reductions in collisions compared to equivalent intersections using 2 or 4-way stop signs or traffic signals. Roundabouts can also be less costly to construct than signalized intersections, unless they are very large. A typical signalized intersection can cost up to $100,000 for the signals and signal engineering alone, plus additional large sums for roadway construction to add turn lanes and other improvements. A typical signal installation also costs $3000 per year for electricity, maintenance of loops, controller, signal heads etc. The traffic capacity of a roundabout will usually be higher than a signalized intersection because there are no yellow and red times (lost time). Because they usually reduce the number of stops drivers have to make, compared with stop signs and signalized intersections, roundabouts can also change drivers' perception of travel times. Reduced stops translate to less driver frustration even if actual travel times are not changed. The appearance of a roundabout, particularly if attractively landscaped, can be a tremendous improvement aesthetically over a signalized intersection by eliminating the clutter of overhead wires and signal poles and often allows signage to be reduced. In addition, they can provide distinctive landmarks or entry points to a community or neighborhood, providing opportunities to create symbols of an area's identity and special character.

**The use of roundabouts rather than signalization should also be considered, instead of traffic signals, the VHB recommendations for intersection improvements or the existing conditions, at a number of additional intersections.** Those intersections where such an approach appears to be particularly appropriate, having a reasonable balance between traffic flows on each leg, having current safety or traffic flow problems, being in areas where signals might be unattractive or overkill, and / or providing opportunities to maintain or create attractive community or neighborhood landmarks are the following:

- Route 130 / Great Neck Road North
- Route 130 / Cotuit Road
- Great Neck Road South / Donna's Lane
- Great Neck Road South / Red Brook Road / Great Oak Road
- Quinaquisset Ave. / Mashpee Neck Road / Orchard Road
- Old Barnstable Road / Lowell Road
- Rock Landing Road / Wading Place Road

**Route 151 should be ultimately configured as a four lane undivided highway** to accommodate "Proposed Buildout" shoulder season traffic. Incremental widening is suggested. That section of **Route 151 between Jobs Fishing Road and "Market Street" should be widened to four lanes by 2004** as part of the reconstruction and signalization of the Route 151 / Jobs Fishing Road / Jobs Fishing Road Extension (Police / Fire entrance road) intersection (see Five Year Plan). **That section of Route 151 between the Jobs Fishing Road and Old Barnstable Road intersections should be widened to three lanes by 2010,** with the center lane serving as a passing lane in the uphill directions on either side of the Quashnet River and then becoming a turn lane at each of those (future signalized) intersections. **Paved shoulders should be increased to at least 4, and preferably 6, feet along the entire length of Route 151 by 2010** to accommodate on-road bicyclists, to provide an emergency breakdown area (in conjunction with another 4-6 feet of graveled shoulder) and to allow temporary operation of an extra traffic lane during the Barnstable County Fair. Finally, **turn lanes should be provided as needed as part of intersection upgrades.** Construction costs for widening Route 151 to a four-lane undivided highway between Sandwich Road in Hatchville and the rotary were estimated by VHB to be $2.4-3.3 million, exclusive of intersection improvement costs and the other items described in the introduction to the Five Year Plan.

**An upgraded two lane cross section is recommended for Great Neck Road North south of Lowell Road** (including twelve foot travel lanes and four foot paved shoulders, which could be striped at 11 and five feet respectively to improve bicyclist safety) **along with the addition of left turn lanes at major intersections.** The latter, which should include the Ryan's Way and Old Barnstable Road intersections , would effectively result in a three lane cross section between the rotary and the Senior Center. **More limited shoulder widening, as feasible, is recommended north of Lowell Road** in the area of the traditional town center due to street trees and limited area available for the proposed adjacent bicycle / walking path reconstruction of the sidewalk along the west side of the road. **These improvements should be made incrementally before 2010 as part of intersection improvement projects and as a reconstruction of the roadway when it next requires repaving.** 4 foot shoulders could safely accommodate "Group A" bicyclists if the posted speed limit is set no higher than 40 mph south of Lowell Road. Under those conditions, the road could be signed as a bicycle route. North of Lowell Road, all bicycle traffic would be directed to use the proposed walking / bike path.

Not constructing an additional two lanes on Great Neck Road North, as is required to deal with projected buildout traffic according to VHB, will result in inadequate traffic capacity even during the shoulder season. As a result, **alternative routings are suggested which would provide other (roughly) parallel north-south travel corridors.** These might include developing or upgrading alternative through routes such as: Jobs Fishing Extension / Lowell Road / Ashers Path / Lovells Lane to Route 130, Meetinghouse Road / Goodspeed's Meetinghouse Road to Route 130 or Simons Road / Noisy Hole Road / Goodspeed's Meetinghouse Road to Route 130. Rather than place the burden of added through traffic on one neighborhood, **a number of such alternate routes should be established to allow local traffic to avoid Great Neck Road North during periods of congestion,** particularly including the third alternative noted above (a portion of which is included in the Five Year Plan) as well as other roadways which provide for an interconnected network of streets in the northern part of the town.

**All of Route 130 north of Lovell's Lane should be upgraded to two twelve foot travel lanes with four foot paved shoulders, 2-4 foot shoulders should be added where possible south of Lovell's Lane and left turn lanes should be added at the Ashumet Road, Echo Road, Pickerel Cove Road, Great Neck Road** (not necessary if this intersection is converted to a roundabout), **South Sandwich Road, Cotuit Road** (again, not necessary if a roundabout is developed) **and Stratford Ponds intersections and at major commercial or industrial driveways. In addition, the creation of new driveways should be limited to the minimum number possible, existing driveways should be consolidated where possible and adjacent commercially zoned land should be rezoned to prevent development of any large traffic generators.** These changes should be made incrementally over the next 10-20 years.

**Great Neck Road South should be improved to 12 foot travel lanes with four foot paved shoulders, along with left turn lanes as appropriate at significant intersections**, including Red Brook Road (unless a roundabout is developed at that location), the proposed extension of Industrial Drive, Amos Landing Road / proposed Otis road, Donna's Lane (again, unless a roundabout is constructed) and the proposed East Steeple Street. 4-foot shoulders would safely accommodate "Group A" bicyclists. In addition, if the road is to be posted as a bike route, the speed limit should be posted at 40 mph.

**Payamps Road should be laid out and extended as a Town road**, with 11 foot travel lanes and four foot shoulder bike lanes (or two-foot shoulders and a separate 8-foot bike path) to connect with Back Road at John's Pond Park to provide more efficient traffic circulation and improved public safety access to the Briarwood area.

**Travel lane widths should be upgraded where feasible to 12 feet on all major and minor arterials and commercial or industrial access streets and to a minimum of 11 feet on all major and minor collector streets**. However, lane striping (as opposed to actual widths provided), may be reduced from 12 to 11 feet where appropriate to provide additional refuge for bicyclists using paved road shoulders.

**Intersection improvements must be constructed by buildout at numerous intersections** identified in the VHB study. Concept plans for many of these improvements were developed by VHB and are shown in Appendix H of the full text of this plan element. In upgrading intersections, a coordinated approach is desirable whereby the level of improvement for the road as a whole and for the intersections along the segment should be in approximate balance.

**A complementary program of travel demand reduction options will have to be implemented to extend the efficiency and usefulness of any capacity improvements that are implemented.**

**All roadways should be designed to accommodate shared use by bicycles and motor vehicles.** This can be accomplished by:

- Establishing and enforcing speed limits to minimize speed differentials between bicycles and motor vehicles on neighborhood streets.
- Implementing "traffic calming" measures.
- Providing wide outside lanes on collector and arterial streets and usable (paved) shoulders on other roadways.
- Maintaining all roadway shoulders fee of debris and snow.

**A network of designated bicycle facilities** (e.g., bicycle lanes, separate bicycle paths, or side-street bicycle routes) **should also be provided through key travel corridors served by arterial and collector streets** to accommodate "Group B & C" bicyclists who cannot safely or confidently utilize shoulder lanes on busy roadways (see Map 8-2).

**In some roadway corridors, multiple bicycle facility approaches may be appropriate,** with shoulder widenings for advanced on-road bikers and separate bicycle paths for younger or less confident bicyclists.

**All future bicycle facilities should be constructed according to the design guidelines specified in the Massachusetts Highway Department's manual entitled "Building Better Bicycling" (1994) and the three primary documents on which it is based,** the AASHTO "Guidelines for the Development of Bicycle Facilities" (1991), the FHWA "Manual on Uniform Traffic Control Devices (MUTCD)" (1988) and the FHWA manual entitled "Selecting Roadway Design Treatments to Accommodate Bicycles" (1994), or subsequent updates to those publications.

**Shoulders at least 4 feet, and preferably 6 feet, wide should be added along the entire length of Route 151 in Mashpee to accommodate "Group A" bicyclists.**

**A number of separate bicycle path facilities running roughly parallel to the section of Route 28 between the rotary and Noisy Hole Road should be constructed** to accommodate "Group B & C" bicyclists in that corridor.

**2-4 foot shoulders should be constructed along Old Barnstable Road between the Falmouth town line and Great Neck Road North** to accommodate "Group A" bicyclists. In addition, the speed limit in the section south of Route 151 should be set at 35 mph.

**A separate bike path should be constructed along the south side of Old Barnstable Road, a portion of Turner Road and along a portion of the Commonwealth Edison power line easement to Lady's Slipper Lane** as a long-range project.

**The existing bike path on the north side of Old Barnstable Road west of Great Neck Road should be extended to Great Hay Road.**

**The existing sidewalk on Old Barnstable Road north of Route 151 should be widened to a 5-8 foot path and extended to Payamps Road, in conjunction with creation of a separate 8-10 foot bike path (or 4 foot shoulder lanes as part of a proposed new roadway) along Payamps Road to John's Pond Park.**

**A bicycle path should be constructed on the west side of Great Oak Road** primarily to sere Group C bicyclists (children) and Group B recreational users headed to South Cape Beach, Jehu Pond Conservation Area and adjacent subdivisions. Part of this path can be located off the road right-of-way on lands owned by the Town and the U.S. Fish & Wildlife Service to provide an attractive recreational experience.

**4-foot shoulders should be added to accommodate "Group A" bicyclists on Route 130 west of Heritage Park.** Such shoulders would allow that section of the road to be signed as a bicycle route. The previously-recommended roadway improvements to deal with traffic increases on that road include such shoulders. East of Great Neck Road any shoulder widening would have to be limited to two feet in many areas to avoid removal of street trees or other disruption of that scenic / historic section of the Town's traditional Main Street.

**The existing multi-use path along Route 130 should be extended to Echo Road** if that area is developed with industries that provide a significant number of jobs.

**Red Brook Road should be posted as a bicycle route,** particularly if 4-foot shoulders are added between Monomoscoy Road and Route 28 in Falmouth.

**4-foot shoulders should be constructed along Quinaquisset Avenue** as part of the next repaving / reconstruction of that roadway, in which case it could be signed as a bike route.

**A bicycle path should be constructed from the rotary area, across the Mashpee River on an abandoned section of Old Route 28 and continuing roughly parallel to Quinaquisset Ave. through the Mashpee River Woodlands and along the former Simons Narrows Road to Mashpee Neck Road.**

**A bike path should be constructed along Great Neck Road South north of Donna's Lane**, or any other alternate routing which would connect the Donna's Lane and proposed Great Neck Road South bike paths with the proposed bike path crossing the Mashpee River noted above. This project should be designed and constructed as part of the development of Mashpee Commons' proposed "Trout Pond" neighborhood.

**Should Industrial Drive be extended east to Great Neck Road South, it should be signed as a designated bike route.**

**2-4 foot, paved shoulders should be added along Hooppole Road between Owl Lane and Back Road and along Back Road between Hooppole Road and John's Pond Park. In addition, an 8 foot wide bike path connection should be constructed between the end of Owl Lane and Hooppole Road** (requiring acquisition of a right-of-way) **along with signing of Owl Lane and James Circle to Route 151 as a Bike Route** connecting with the proposed Route 151 bike path.

**If Payamps Road is built between Old Barnstable Road and Back Road, it should include 4-foot-wide paved shoulders and be signed as a bike route. If the roadway is not built, a separate 8-10 foot wide bike path is suggested.** In either case, it is recommended that **Algonquin Avenue be signed as a bike route**, possibly with the addition of two foot paved shoulders, and be connected to the new roadway or bike path.

In addition to the previously mentioned bike path (see Five Year Plan), **the construction of 2-4 foot wide paved shoulders is recommended along Lowell Road** to accommodate "Group A" bicyclists.
**Lovell's Lane and Quashnet Road should be increased in width to 24 feet to safely accommodate both motor vehicles and bicycles.** As noted in Section 8.A., Lovell's Lane might also be considered as an alternative routing for bicycles vs. Great Neck Road North in conjunction with construction of an 8-10 foot bike path on the currently unpaved portion of Lovells Lane and Ashers Path between Quashnet Road and Lowell Road.

**2-4 foot paved shoulders should be added along South Sandwich Road. A paved 4-5 foot sidewalk should also be built on its east side, with a proper non-mountable curb or five foot separation between the sidewalk and roadway. In addition, an 8-10 foot wide bike path is recommended on a separate location through the Town's Besse Bog Conservation Area from the intersection of Route 130 and South Sandwich Road to connections with Windsor Way, Sandy Fox Drive and Scituate Road** (right-of-way acquisition required for the latter). Should the Town decide to construct a school on the current site of the Wampanoag Rod & Gun Club (see School Facilities element) or acquire the property for conservation purposes, **this bike path could be extended to Leamington Lane. Should this bike path be constructed, the connecting roads mentioned should be signed as bike routes.**

**4-foot paved shoulders should be constructed along both Mashpee segments of Sandwich-Cotuit Road and be signed and marked as bike lanes.** The Town of Sandwich should be requested to develop the same roadway treatment along their portion of the road. As an interim or additional measure, **Holly Way, Timberlane Drive, Nobska Road and Shields Road could also be signed as a bike route, along with a**

**Hornbeam Lane connection to Cotuit Road at Scituate Road.** Depending on where the Town decides to locate its future new school facilities, **a separate bike path should also be considered as a long-range project along the portion of this road between Route 130 and Leamington Lane and any construction projects along that roadway should reserve room for such a path.**

**A bike path should be constructed to connect Cotuit Road at Leamington Lane to Santuit Pond Road** and the Santuit Pond Estates subdivision through a wooded area north of Santuit Pond which is primarily owned by the Town.

**If Noisy Hole Road is fully constructed as a Town road** between Route 28 and Route 130, **4-foot paved shoulders should be included or,** should the Town construct a new school or schools between Town Hall and Goodspeed's Meetinghouse Road (see School Facilities element), **a separate 8-10 foot bike path should be considered as an alternative**, along with two foot paved shoulders. **Sunset Strip could be signed as a bike route if the suggested Noisy Hole Road improvements are carried out.**

**Meetinghouse Road should be signed as a bike route, with possible shoulder widening to 2-4 feet** at some future date if traffic increases reduce bicyclist safety. Should a new school be built behind Town Hall, a bike path connection to the school and the Route 130 path should be built to divert bike traffic from the dangerous Great Neck Road North / Meetinghouse Road intersection. If the recommended relocation of Quinaquisset Ave. to a signalized intersection with Route 28 and Meetinghouse Road is constructed, this route could be connected to the proposed bike path crossing of the Mashpee River to provide an attractive north / south bike route alternative to Great Neck Road North.

**2-foot paved shoulders should be added to Sampson's Mill Road** to accommodate "Group A" bikers passing through from Cotuit, although the road would still be inadequate to serve as a signed bike route. In addition, should the intersection of Sampson's Mill Road with Route 28 be relocated to a signalized location opposite Noisy Hole Road, the new section of roadway should have either 4 foot paved shoulders or a separate bike path facility, depending on the choice selected for Noisy Hole Road. This would allow safe bike access from the Sampson's Mill Road area to the proposed new school and other points in north Mashpee, and would provide safe access for residents of that part of town to the proposed recreation area on the west side of the current Sampson's Mill Road at Route 28.

**A bicycle path should be constructed between Sampson's Mill Road and Harwich Road**, either along the Commonwealth Electric power line easement or along the south side of Route 28 (on new expanded right-of-way). **Harwich Road and Brewster Road** would **become signed bike routes** to provide a further connection to the proposed new Mashpee River crossing and Mashpee Commons. Finally, Simons Road, which extends from Sampson's Mill Road to Quinaquisset Ave. through the Willowbend development (and has been renamed Willowbend Drive by the developer near Quinaquisset Ave.) should be signed as a bike route if it is ever paved for that entire length.

**The paved shoulders on Orchard Road should be widened by two feet** on both sides to accommodate bicyclists.

**4-foot paved shoulders should be added on Mashpee Neck Road north of Simons Narrows Road and two foot paved shoulders south of that road** in order to improve safety for bicyclists.

To accommodate safer bicycling, **2-4 foot wide paved shoulders should be added on Simons Narrows Road east of Mashpee Neck Road.**

**Frog Pond Close, Lighthouse Lane and Quaker Run Road should be signed as a bicycle route.**

**A recreational bike path should be constructed through the Mashpee River Woodlands parallel to Mashpee Neck Road** as is recommended in the management plan adopted for that conservation area by the Conservation Commission in 1986.

**At the New Seabury entrance between Great Neck Road South and Rock Landing Road, then extending to Daniel's Island Road, a new 8-10 foot bike path is recommended. The currently closed section of Daniel's Island Road, which extends to By-the-Green Way could also then be rehabilitated as a bike path.**

**The existing partially paved 2-4 foot wide paths along the west sides of Rock Landing Road and Wading Place Road should be paved and widened to 5-8 feet** to accommodate bicycles.

**A new 8-10 foot bike path should be constructed along Shore Drive West between Popponesset Marketplace and Triton Sound Circle** or a connection should be made between the western end of Shore Drive (at Rock Landing) and the Maushop Village street system to provide a signed bike route.

**Four foot, paved shoulders should be added to Red Brook Road / Wading Place Road between the wide New Seabury entrance area and the beginning of the median island in Wading Place Road.**

**Two foot, paved shoulders should be added on both sides of Rock Landing Road along its entire length** to allow safer bicycling.

**Bicycle parking facilities should be provided at existing public and private facilities** including town buildings, schools, parks, beaches and commercial and industrial developments. In addition, **bicycle parking facilities should be required in all new public and private development projects** as appropriate.

**A network of sidewalks and other pedestrian facilities should be developed in the rotary area** as an expansion of the current private sidewalks at Mashpee Commons to adjacent properties. The high-density development pattern proposed for the area lends itself to walking as an alternative to cars and bicycles. New links should be established with the Deer Crossing, Talanian (flea market), Windchime Point, Sea Mist, Sandalwood, Sandpiper and Quashnet Valley neighborhoods and Mashpee Commons' future proposed neighborhoods. The high school, TCB Mashpee Village, Southport and other more distant locations would be linked to this central area by previously described bicycle path facilities that will operate as multi-use paths.

**A network of sidewalks and other pedestrian facilities should be developed in the traditional Mashpee village center area around Town Hall, Attaquin Park and the proposed new elementary school(s) east of Town Hall.** The existing Great Neck Road North sidewalk and Route 130 multi-use path should be supplemented by the previously-described bike paths as well as sidewalks along South Sandwich, Noisy Hole, Quashnet and Ashumet Roads and Lake Avenue and existing and proposed walking trails.

**Sidewalks and other pedestrian facilities should be developed where they will provide access routes to schools** (to facilitate walking and reduction of busing costs), **and Town recreation areas.** All such pedestrian facilities should be designed and built to meet the requirements of the Americans with Disabilities Act (ADA), which requires that new or reconstructed sidewalks have a minimum unobstructed width of four feet. In addition, cub cuts should be provided at all roadway and (where necessary) driveway intersections. Sidewalks should also be separated from adjacent roadways by vertical curbs and, preferably, at least five feet of space.

**The Sea Line transit route should be enhanced through an increase to hourly bus service and use of heavy-duty transit coaches** (also see Five Year Plan).

**A transit center should be developed** at Mashpee Commons or some other location in the vicinity of the Rotary. The center should provide at least three to four bus bays, a covered passenger waiting area (shelter) and information kiosks.

**Bus stops, turnouts, and shelters should be developed along bus routes** in the vicinity of major trip attractors (commercial, industrial, and recreational developments) and major trip generators (residential developments). Private participation should be sought in the development of these transit facilities.

**The "Mashpee Trolley" feeder bus service should be refined** to increase ridership, which has been disappointingly low. The Trolley should be used as a feeder bus service providing hourly bus service linking the Mashpee Transit Center with the Santuit Pond area via Great Neck Road North, Route 130, South Sandwich Road and Cotuit Road, with the John's Pond area via Route 151 and Algonquin Avenue and with Great Neck Road South, Popponesset Marketplace and Great Oak Road to South Cape Beach in the summer. As the Town's population increases and proposed dense neighborhoods in the rotary area are built, transit services should become more economically feasible and more heavily used.

**A park-and ride facility should be provided** at Mashpee Commons or an alternative location in the vicinity of the Mashpee Rotary. Other locations along Route 28, such as land owned by Commonwealth Electric on the southwest corner of Route 28 and Orchard Road, should be investigated to encourage residents to use the Sea Line bus after service is enhanced.

As growth continues, the town and its neighbors should explore the potential for other services, examples of which include the possibility of either a **public feeder bus** or **employer shuttle van connection between downtown centers** (e.g., Mashpee Commons) **and remote parking facilities** along the Cape's regional highway system (e.g., Exit 2 of Route 6 in Sandwich). Such facilities should be considered in continuing discussions with the CCRTA and affected communities. Further studies on implementation feasibility and operating details will have to be undertaken as conditions become known in future years.

**Development of a commuter bus service to the new MBTA rail station at Plymouth should be pursued.** The route could also serve the Sagamore rotary commuter parking area, Sandwich, Forestdale / South Sandwich, Mashpee Town Hall and Mashpee Commons, possibly continuing via Route 28 to Falmouth and Woods Hole, or to Cotuit and Hyannis. Potential for such service should be discussed with the MBTA, CCRTA and private bus lines such as P&B, Bonanza, Pina and other local operators.

**Mixed use development, larger green space requirements and lower trip-generating uses should be encouraged** by the Town's zoning and other regulations in order to reduce potential future traffic levels.

Given the close relationship between parking supply and travel mode choice, **maximum, in addition to minimum, parking space requirements for various land uses should be adopted** as part of the Town's zoning regulations. The Town should coordinate with area developers and commercial property owners in setting appropriate limits.

The Town should coordinate with area employers to **develop a trip-reduction program** involving the following measures. The program should be implemented as appropriate for proposed developments and be extended, where possible, to existing employers as well.

- ridesharing (carpooling and vanpooling)
- preferential parking for poolers

- alternative work schedules (flexible hours, 4-day work week, telecommuting, etc.)
- parking charges and/or subsidies to those using alternative modes
- guaranteed ride home program
- provision of bicycle racks or lockers, as well as shower facilities
- employee education and incentive programs
- periodic monitoring and reporting to determine compliance with objectives
- appointment of transportation coordinators

The Town should consider developing joint agreements with neighboring towns (Falmouth, Sandwich, Bourne, Barnstable), the CCC and the CCRTA to **locate and implement remote parking facilities at regional highway interchanges** (e.g., Route 6, Route 28) in order to intercept motorists destined for inner Cape employment sites, shopping facilities, or other attractions (e.g., Mashpee Commons, South Cape Beach). Such facilities would have to be coordinated with CCRTA transit route extensions and bicycle routes. As an example, parking could be provided at Exit 2 of Route 6, with a transit route running along Route 130 or Cotuit Road into Mashpee, or possibly a joint employer shuttle bus or van.

The Town should consider implementation of **variable message signs and/or advisory radio to advise motorists about traffic incidents and potential route diversions**. Such an effort would most appropriately be done in conjunction with neighboring towns through the proposed upper Cape Transportation Management Association.

The Town should work with the Cape Cod Commission and the proposed Transportation Management Association on the development of a **regional freight management program.** including possible shifts from truck to rail where possible.

The Town should initiate discussions with local employers regarding **voluntary time restrictions on truck movements** (away from peak commuter and tourist traffic periods).

The Town should **develop a promotional program** for town residents, employers, employees, tourists, truckers, and others using town roads. The program should focus **on ways to encourage alternative-mode travel behavior and discourage single-occupant auto use** to the extent possible. This could be done as a joint effort with adjacent towns such as Falmouth, or even more regionally with other neighboring communities through the proposed Transportation Management Association.

The Town should **make the area's political representatives aware of the need for alternative transportation** and enlist their services in the effort to get things done. Strong political support will be necessary to accomplish many of this Plan's proposals.

An **informational brochure on alternative transportation facilities and services available**, routes, schedules, costs, benefits of using alternative modes, etc., should be developed. It could be disseminated through mailings or distribution at area businesses.

**Permanent information booths or kiosks should be established and appropriately located** (e.g., at Mashpee Commons) **where residents, visitors, and others can obtain travel-related information.** These facilities could be simple ones involving only printed material or could be more elaborate, incorporating either a staff person to answer questions or computer-based equipment of the type found at transportation terminals.

An **incentive program** should be considered to encourage as many people to participate as possible in alternative mode programs. This can take various forms. For example, actual subsidies may be worked out whereby part of an employee's transit cost is reimbursed by the employer.

**Discount vouchers** could be provided by the Town, TMA, employers, merchants or others **for rental of bicycles** by tourists, other visitors or residents.

**Periodic surveys** (via questionnaire, telephone, interview, etc.) **should be undertaken to identify attitudes and opinions on local and regional transportation programs and, in particular, on new services or facilities**. Data collection and analysis can be done by the Town, CCC, CCRTA, TMA, bicycle clubs or other appropriate groups or organizations. The important thing is to obtain the information, then interpret the results for subsequent use in evolving programs and facilities toward more efficient and effective use.

The Town should consider hiring a marketing consultant to assist with the advertising and promotional aspects of the proposed program to promote alternative transportation modes. This is another project that might be most appropriately accomplished through the proposed Upper Cape TMA.

The Town should **provide the necessary alternative modal facilities** to enable use by willing participants. These include **bus shelters, bicycle racks and storage lockers, various signage and pavement markings to designate bicycle lanes and routes, etc.** This could require Town funds but could also involve conditions applied to development permit approvals or solicitation of grants and donations from public and private sources, including employers and businesses in the area. Some state and federal programs (including ISTEA) also permit funding for these types of improvements.

**Mashpee's "home page" on the WWW** or, perhaps more effectively, one developed for the upper Cape region, could offer facts about area attractions to residents and prospective visitors and, most importantly, provide important information on travel to and through the area that emphasizes alternative modes. The web site should be linked to those sites maintained by the CCRTA, MBTA, Cape Cod Commission, Plymouth & Brockton Bus Co., Bonanza Bus Co., the Steamship Authority and others that address alternative transportation services.